THE GENEVA ASSOCIATION

The 12th Geneva Association Annual Liability Regimes Conference

Session 2: Cyber Risks and Accumulation Issues

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SPEAKERS – Session 2

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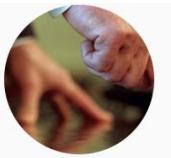

Accumulation

What ever that means in cyber?

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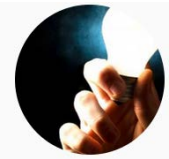



Cyber in numbers: The Big Bang Theory

- **50/50** "There are only two types of companies: those that have been hacked, and those that will be." Robert Mueller, FBI Director, 2012
- **51bn €** financial loss in 2015 through cybercrime and cyber espionage in Germany, Bitkom Report on Economic Security
- **100mio** lines of code in Windows 10 with Office 365 locally installed on each computer.
  - counting in all other applications: 250mio - 10bn lines of code on your computer.
- **7.73bn** mobile phones Statista 2016
- **3,425bn** direct internet connections Statista 2016
- **$3{,}4 \cdot 10^{38}$** IPv6 addresses (340 Sextillion)
- **1998** IPv6 specification was designed and published as RFC2460

How much cybercrime was out there 18 years ago?



Insurances demand Risk Management

- Enterprise of 50.000 employees operates around 50.000 different applications, 100.000 Computers and Servers without peripherals and without SCADA and ICS-systems ➔ 1mio known attack vectors
- Can you really do risk management for Cyber:
  - criminals (money)
  - organized crime organization (more money)
  - states (espionage)
  - former employee – now he is mostly unfriendly (Revenge)
  - supplier (advantage, revenge)
  - competitor (advantage)
  - do gooder, do better, starry-eyed idealist (Attention)

Risk Management will always be affected by criminal intention!



Can you insure against cyber criminals?

An effective Cyberattack will misuse:

- Bugs in software and hardware
- Zero-day-exploits
- Configuration mistakes
- Or an unaware employee
- Or your entire (not well prepared) organization

Imbalance*:*

A company has to protect against ALL vulnerabilities but the criminal needs only ONE attack vector.



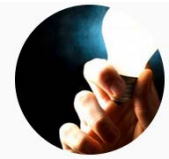
How to ensure Cybersecurity against these threats?

States:

- Around 70 States already developed cyber strategies (ENISA)
- EU- NIS Directive, German IT-Security Law, Regulation, cooperation models
  - Mandatory Notification for Critical Infrastructure and Digital Service Providers
  - Risk Management ☺
  - CERT (Incident Handling, Threats and Vulnerabilities, Information Exchange)
  - Crises Management
- NATO declared Cyber under Article 5 (collective defence)

Companies including SMEs:

- **???**


Challenges:

- No one is owner of the internet - Attribution is quite difficult and nearly impossible.
- The complexity is to high:
  - We all use the internet everywhere, at home, on our mobile phone, at work, for fun, we do shopping, online banking, travel booking, mobile apps, etc.
    - The free services are paid by our data (data protection, who cares)
    - The rest we pay with an old fashioned credit card, prepaid cards, paypal, Apple Pay or with (digital) crypto-money (Bitcoin, Ether, etc.)
      - Have you ever heard about Ripple, DogeCoin, PeerCoin, LiteCoin, AuroraCoin and all the others?
      - States, banks and criminal organisations must be heavily involved – where is all the money - stolen through ransomware?
- **Cyberattacks are a huge business case.**

Insurance companies have to insure someone against the business of another.



Questions I asked myself?

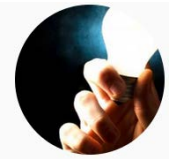
- Is Digitization itself an opportunity or a risk?
- Is a well known but insecure infrastructure insurable?

  No CIO knows his infrastructure exactly!
- Is cyber accumulation the end of the (insurance) food chain?

  End of the day someone has to pay!
- How can you do (accept) a risk assessment without out knowing the real risks?
- How can you insure a company if you know that it will be easily attacked

As a perpetrator I would see my new cyber-business-opportunity in attacking insurance companies.

Either You pay me or I let you pay!


Thank you
for your
uninsurable attention!
….any more questions?

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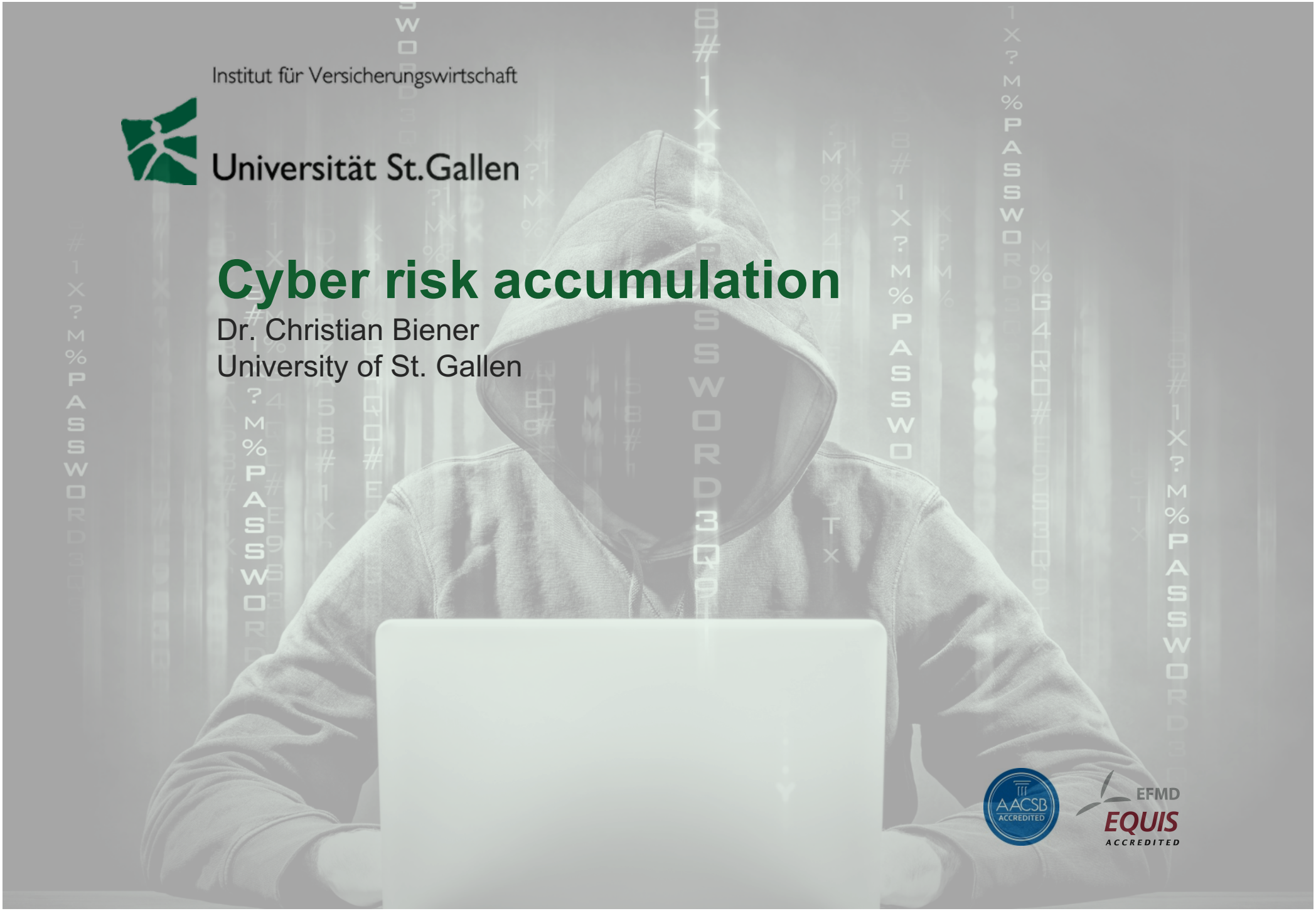

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Cyber risk accumulation

Dr. Christian Biener
University of St. Gallen

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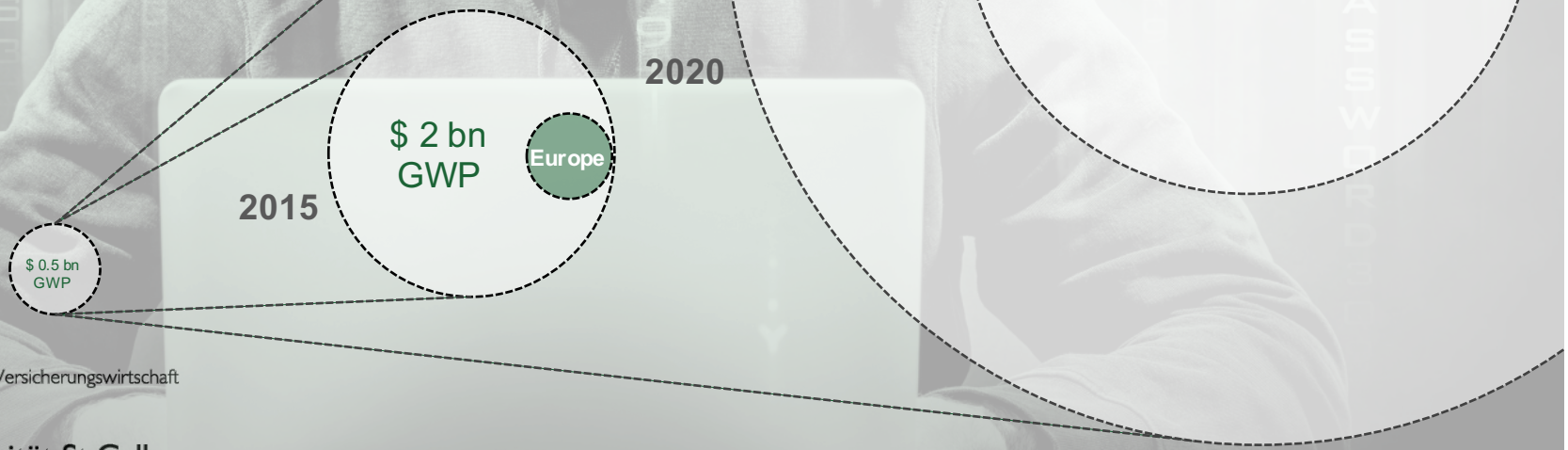
Big risk and small insurance market: demand side frictions…

„In 2015, only about 19% of US corporations had cyber coverage."

Source: Aon & Ponemon, 2016



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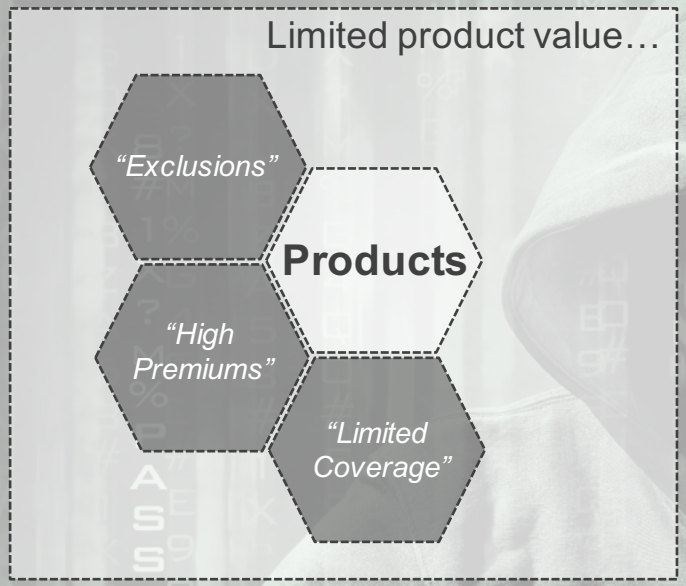
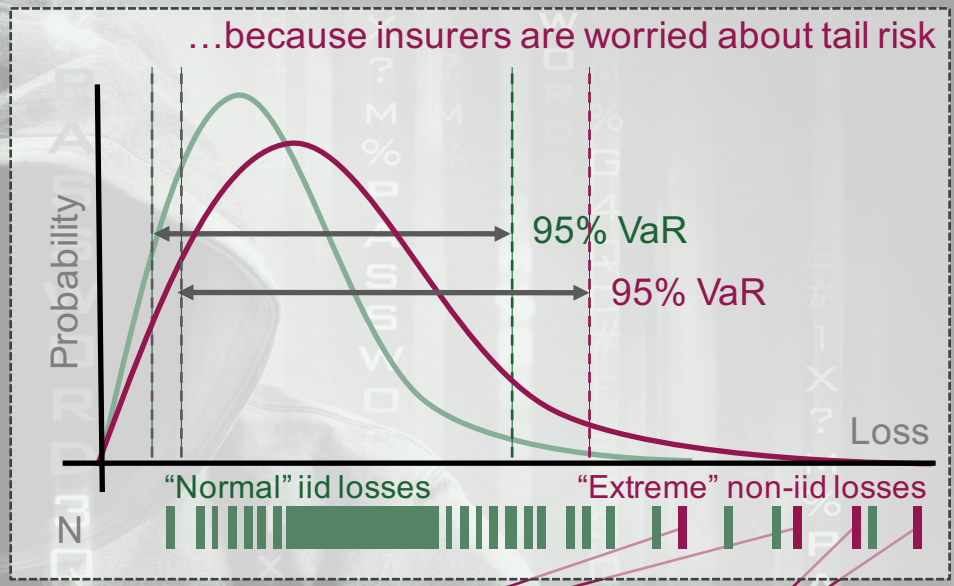
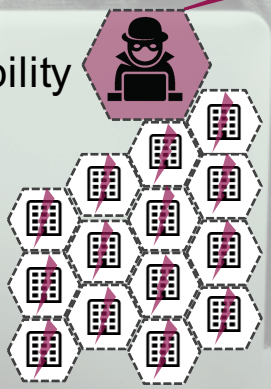
GWP: Gross Written Premiums | Source: PWC, 2015

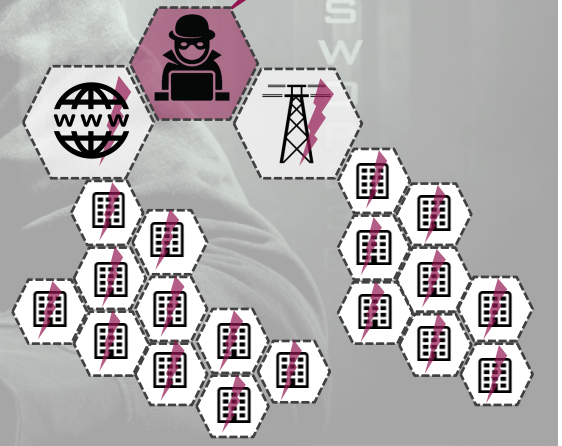
...caused by unresolved supply-driven insurability issues





- Not observed – predictability
- Unknown correlations
- Maximum possible loss
- Moral hazard





Can we grasp cyber accumulation?

Addressing (some) actuarial issues

- Blending data (e.g., external data, data pool)
- Extreme value / threshold models
- Scenario analysis + exposure data
  - Backward-looking
  - Forward-looking (e.g., RMS / Cambridge)

Remaining issues

- Dynamic characteristics of underlying risk
- Arbitrariness of scenarios
- Scenario approaches have been shown to be inaccurate, e.g., in operational risk modeling

Ambiguity of tail distribution

Market development options

Increase capacity through collaboration:

- Data pool
- Insurance pool
- Alternative risk transfer (e.g., cyber cat bond)

Define the role of the government:

- Cyber risk management standards
- Reporting obligations
- Re-insurer of last resort for extreme losses

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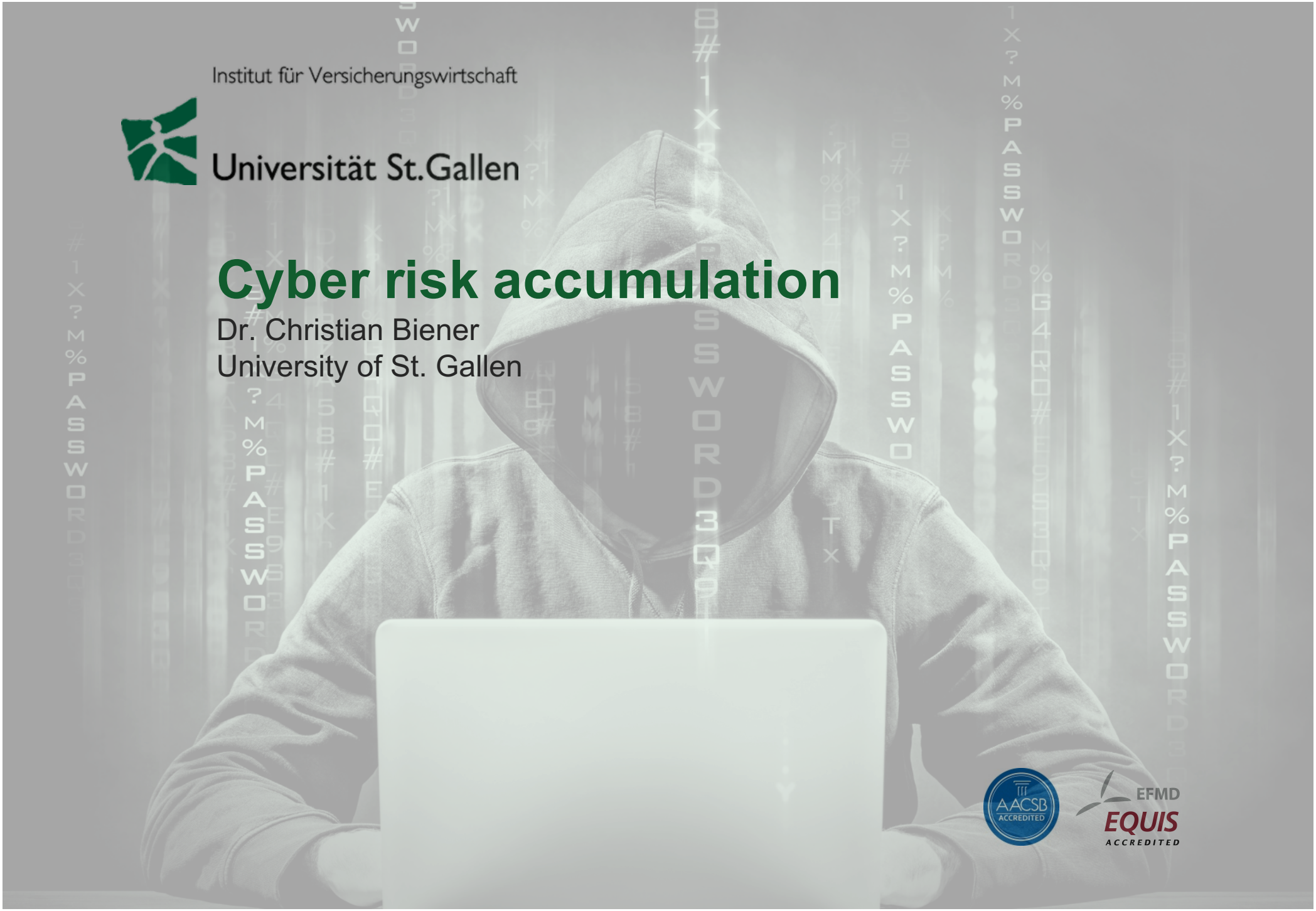

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The Challenges of Insuring New Technologies

Session 2 - Cyber Risk and Accumulation Issues

Annual Liability Regimes Conference- The Geneva Association

Munich 17th /18th November 2016

Willis Re

Topics

- **What** is the Insurance Industry doing in the so called ”cyber” space and **where** is/are the “cyber” Insurance product (s) directionally heading?

- **What** are the key threats, obstacles and **how** is the Industry currently managing those threats?

- **Is** there potential scope for Industry co-operation to improve risk quantification, improve liquidity in trading risk and deepen the market?

State of the Global Cyber Insurance market

Cyber /ˈsʌɪbə/ adjective: cyber relating to or characteristic of the culture of computers, information technology, and virtual reality "the cyber age“ Origin 1980s: abb. of cybernetics

- A beacon of growth for the industry but definitions are confusing
  - Cyber exposure embedded in most commercial lines of business - **Passive**
  - Current market focussed on *loss of data*, but morphing towards *loss* of control - Limited shift towards *all lines* cyber e.g. Ford Corp – **Active**

- Global Insurance market but overwhelmingly US-centric mirroring legal/statutory drivers
  - Circa $2bn DWP but anticipated to expand in size/geography as risk drivers evolve
  - Concentrated risk pools based on industry and size
  - Dominated by a handful of pioneering cyber writers

- To put this into context the Global cyber threat protection/consulting business is >30x $100bn

Prevailing dynamics, challenges and opportunities

- Underwriting results have (generally) been outstanding however, as market pivots towards *loss of control* prior results less meaningful
- Insurance buyers seeking/require broader protection for damage/ loss of digital assets/capability e.g. Business interruption, Contingent business interruption
- Nascent technical underwriting skills coupled with concerns about systemic accumulation, real-time mutation in underlying threats and fluid view on boundaries of coverage are constraining appetite and capacity in both primary and secondary markets
- Nature of risk inherently systemic but industry lacks both a coherent approach and a consistent framework for evaluating downside risk across the return period spectrum
- Some efforts by Third Party Vendor Model firms to provide limited scenario-based modelling support to their Insurance clients

Select aggregation perils

- Digital
  - Common vulnerabilities in cyber security programmes (or lack of)
  - Common shock vulnerabilities
  - Shared vendor/api infections leading to secondary/cascading cyber attacks across a shared network
  - Aggressive, calculated, maliciously motivated attacks on a series of linked companies
  - Malware infestation of shared data centre
  - Known common data software/patching failure leading to vulnerabilities
  - Malware infestation in internet provider services/nodes (data service centres, internet service centres and internet traffic satellites)

- Physical
  - Destruction of data service centres (explosion, fire, lightening, power outage etc.
  - Destruction of internet cables (e.g. transoceanic submarine cables
  - Destruction of internet service nodes (e.g. Crimean case study)

Andrew Coburn, director of the External Advisory Board of the University of Cambridge's Centre for Risk Studies - Based on a worst-case scenario, a series of unexplained information technology failures on “systemically important technology enterprises” (SITEs), such as Oracle Corp., International Business Machines Corp., Microsoft Corp., SAP AG/Sybase and Teradata Corp., could lead to a loss of $15 trillion in gross domestic output over five years, on a similar scale to the $18 trillion lost during the recent financial crisis

Scope for improving market liquidity

- Modelling transformed Property Cat market - pre-hurricane Andrew, limited capacity but today multiple markets worldwide with increasing cross-over into wider capital markets, so **capacity** *per se* is not the issue

- Cyber represents extension to business interruption and CBI which Property Cat market able to cover *provided* it feels these risks are properly understood and underwritten

- Today's market for cyber has similarities to pre-Andrew property cat market
  - AIR, RMS and other vendors racing to fill the modelling void, but not yet there
  - Challenge is harnessing data given the bewildering amount available in cyber-space, and need to create confidence that cyber aggregation can be quantified <u>despite evolving nature of threats</u>

- Once risks understood, models will gain credence and property cat roadmap suggests liquidity will follow