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# Proceedings of the Researchers' Corner for the 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance 2022

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## **Foreword**

The 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance [Förderkreis Rückversicherung] was held 24 June 2022. As a result of the COVID-19 pandemic, the event was held in online format again this year. Some 110 representatives of the (re)insurance companies involved in the Sponsoring Group took part in the meeting, along with guests. Offered for the eighth time as part of the Annual Meeting, the Researchers' Corner gave the seven academic researchers at the Cologne Research Centre for Reinsurance an opportunity to deliver a presentation on the research project in which each is involved in 2022.

Over the course of three sessions, the most important results of the scientific studies by the Cologne Research Centre for Reinsurance were presented and discussed. The heterogeneity of the topics presented reflects the dovetailing of the Cologne Research Centre with reinsurance practice.

### **Session 1**

- a) Erik Winkler (LL. B.): Insurance Capital Standard (ICS)
- b) Lihong Wang (M.Sc., FCII): Developments in Chinese Online Insurance 2022
- c) Jörg Dirks (M.Sc., FCII): Retrocession within an ESG-compliant business orientation

### **Session 2**

- a) Robert Joniec (M.Sc., FCII, cand. PhD): Classic reinsurance placements and auctions – We know that we know nothing
- b) Wolfgang Koch (M.Sc., FCII): Accounting for climate-change scenarios in the ORSA

### **Session 3**

- a) Frank Cremer (M.Sc., FCII, cand. PhD): Limits of (re)insurance cover – An analysis of exclusions of cyber-conditions
- b) Fabian Lassen (M.Sc., FCII): ESG criteria in reinsurer underwriting

With the publication series, 'Proceedings of the Researchers' Corner', the Cologne Research Centre for Reinsurance meets the desire for publication of the research results of our researchers along with the related discussions. The titles are reproduced in keeping with the above agenda of the Researchers' Corner for the 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance.



We would like to express our deep gratitude to the sponsors with whose assistance the activities of the Cologne Research Centre for Reinsurance, and the Annual Meeting of the Sponsoring Group Reinsurance in particular, are possible.

Cologne, July 2022

Prof. Stefan Materne

## **Cologne Research Centre for Reinsurance**

The Professorship for Reinsurance was established in 1988; Prof. Stefan Materne received the first appointment to the professorship. The position was redesignated the Chair for Reinsurance by rectorate decision in 2008. The basis for this was the defined field of instruction and research comprised by reinsurance together with related topics such as alternative risk transfer, captives, insurance-linked securities, etc. In particular, the integration of the Chair of Reinsurance within the Institute of Insurance Studies at the Cologne University of Applied Sciences permits a focus on instruction and research in the field of reinsurance. The focus on the specialisation in reinsurance, in turn, promotes the international reputation of the chair and of the affiliated Cologne Research Centre for Reinsurance.

The Cologne Research Centre for Reinsurance currently employs six academic researchers, two academic project managers, a research assistant and two student assistants and ensures the bidirectional transfer of knowledge between theory and practice. This takes place, firstly, through continuous, bilateral project cooperation as well as an exchange of views with the respective experts in the field, and secondly, through publications by the Cologne Research Centre for Reinsurance and the two major scientific events held each year (Cologne Reinsurance Symposium, Annual Meeting of the Sponsoring Group Reinsurance).

Since 2004, the Cologne Research Centre for Reinsurance has hosted the Cologne Reinsurance Symposium free of charge, an annual event with more than 500 attendees. This event, with its top-flight presenters and international implementation with the aid of simultaneous interpreting, shapes the international reputation of our reinsurance-oriented activities.

The Cologne Research Centre for Reinsurance is fully financed by third-party funds provided from the Sponsoring Group Reinsurance, in which there are currently 88 companies involved. These are risk carriers (with an approx. 85% market share worldwide) as well as cedants and reinsurance-oriented service providers. Whether in the academic world or in the reinsurance market, there is no other institution similar to the Sponsoring Group Reinsurance.

## Förderkreis Rückversicherung



As of: July 2022

The Annual Meeting of the Sponsoring Group Reinsurance is held once a year, offering another major scientific event for the Cologne Research Centre for Reinsurance. Participants include representatives of (re)insurance-company members of the Sponsoring Group Reinsurance along with invited guests. *Researchers' Corner*, a lecture event in which the six current academic researchers and the research assistant of the Cologne Research Centre for Reinsurance present the results of their research, represents another important opportunity for interaction with practitioners.

The solid practical relevance of our research activities is manifested in their full financing by the Sponsoring Group Reinsurance – which is funded by the (re-)insurance industry – and in excellent attendance at the Cologne Reinsurance Symposium and the Annual Meeting of the Sponsoring Group Reinsurance.

We want to thank the Sponsoring Group Reinsurance, the University leadership and administration, ivwKöln [the Institute of Insurance Cologne] and the employees of the Cologne Research Centre for Reinsurance for all their support provided towards research projects and events.

15<sup>th</sup> Annual Meeting of the Förderkreis Rückversicherung  
[Sponsoring Group Reinsurance]  
Researchers' Corner, 24 June 2022


Insurance Capital Standard (ICS)

Erik Winkler, LL. B.

**What is the ICS?**

**Whom does the ICS apply to?**

**How should the ICS be implemented?**




- The ICS is an attempt to establish a risk-based, global capital standard for internationally active insurance groups (IAIG)
- The IAIS standards are not legally binding
- Binding effect only through implementation of national supervisor (legal binding effect: inclusion of local law)

Insurance groups are considered internationally active if they meet minimum requirements for...

**internationality and size.**

3 countries	10% gross premium outside of the home country	USD 50 bn Assets last 3 years	USD 10 bn Gross premium last 3 years
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**United States**

- AIG
- Berkshire Hathaway
- Chubb
- Fairfax Financial Holdings
- Liberty Mutual Insurance Group
- MetLife
- Prudential
- Reinsurance Group of America

**Germany**

- Allianz
- HDI
- Munich Re

**France**

- AXA
- BNP Paribas Cardif
- CNP Assurances
- COVEA
- Crédit Agricole Ass.
- GROUPAMA
- SCOR
- SOGECAP

**How do the differences manifest themselves during implementation?**

**Observation phase**      **Implementation phase**

Data analysis ICS, Review of aggregation method, internal models, etc.

Every year

Q2: Report to supervisor

Q3: Transmission to IAIS

Q4: Adjustment ICS

Adoption ICS 2.0

2020      2021      2022      2023      2024      2025

Bafin, Global Capital Standard: Insights on the International Capital Standard for Internationally Active Insurance Groups, 5 September 2018, Berlin. [https://www.bafin.de/Bafin/Documents/Verfahren/IC/ICStandard/2018/18\\_09\\_05\\_GlobalCapitalStandard\\_en.pdf](https://www.bafin.de/Bafin/Documents/Verfahren/IC/ICStandard/2018/18_09_05_GlobalCapitalStandard_en.pdf) (Accessed on 5 May 2022)

**Solvency II**  
(Consolidation method)

Country A Entity	...	Country Z Entity
Standardized Framework		
Group Capital		

Own Funds  
Actuarial Provisions

Solvency Capital Requirement  
Risk Margin  
Best Estimates

**Insurance Capital Standard**  
(Consolidation method)

Country A Entity	...	Country Z Entity
Standardized Framework		
Group Capital		

Qualifying Capital Resources  
Market Adjusted Value / GAAP Plus

Prescribed Capital Requirement  
MOCE  
Current Estimates

**Group Capital Calculation**  
(Aggregation method – U.S. alternative approach)

Country A Entity	...	Country Z Entity
Country A requirements	...	Country Z requirements
Scalar A	...	Scalar Z
Group Capital		

IAIS:

Comparable outcomes to the ICS means that the Aggregation Method (AM) would produce **similar, but not necessarily identical, results** over the trigger supervisory action on group capital adequacy grounds (IAIS)

GDV, Insurance Capital Standard: An opportunity for German insurers, 13 September 2021, Berlin. [https://www.gdv.de/insurance-capital-standard/2021/13\\_09\\_21\\_ICStandard.pdf](https://www.gdv.de/insurance-capital-standard/2021/13_09_21_ICStandard.pdf) (Accessed on 23 May 2022). U.S. Chamber of Commerce, Insurance Capital Standard and the Aggregation Method, Summer 2019, Washington D.C., United States. [https://www.commerce.org/media/2019/08/20/ICS-CALC\\_InsurancePaper2\\_v4-DIGITAL.pdf](https://www.commerce.org/media/2019/08/20/ICS-CALC_InsurancePaper2_v4-DIGITAL.pdf) (Accessed on 25 May 2022).

GDV, Insurance Capital Standard: An opportunity for German insurers, 13 September 2021, Berlin. [https://www.gdv.de/insurance-capital-standard/2021/13\\_09\\_21\\_ICStandard.pdf](https://www.gdv.de/insurance-capital-standard/2021/13_09_21_ICStandard.pdf) (Accessed on 23 May 2022). U.S. Chamber of Commerce, Insurance Capital Standard and the Aggregation Method, Summer 2019, Washington D.C., United States. [https://www.commerce.org/media/2019/08/20/ICS-CALC\\_InsurancePaper2\\_v4-DIGITAL.pdf](https://www.commerce.org/media/2019/08/20/ICS-CALC_InsurancePaper2_v4-DIGITAL.pdf) (Accessed on 25 May 2022).

IAIS, Summary and residues of comments received during the public consultation on the draft definition of comparable outcomes and high-level principles on the criteria that will be used to address whether and how comparable outcomes can be achieved, 15 May 2021. <https://www.iais.org/~/media/2021/05/15/05-15-2021-Summary-and-Residues-of-Comments-for-the-Comparable-Outcomes-Consultation.pdf> (Accessed on 25 May 2022). U.S. Chamber of Commerce, Insurance Capital Standard and the Aggregation Method, Summer 2019, Washington D.C., United States. [https://www.commerce.org/media/2019/08/20/ICS-CALC\\_InsurancePaper2\\_v4-DIGITAL.pdf](https://www.commerce.org/media/2019/08/20/ICS-CALC_InsurancePaper2_v4-DIGITAL.pdf) (Accessed on 25 May 2022).

# **15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance**

**Researchers' Corner, 24 June 2022**

## **Insurance Capital Standard (ICS)**

**Erik Winkler, LL. B.**

Erik Winkler (LL. B.) is a research assistant at the Cologne Research Centre for Reinsurance. After completing his Bachelor's degree in law at the Leuphana University of Lüneburg, he completed his Master's degree in 'Risk and Insurance' at the Institute of Insurance Studies at the Cologne University of Applied Sciences. From October 2022, he will be working for Liberty Mutual Re as an assistant underwriter for Marine & Energy.



Discussions around equivalence decisions and bilaterally negotiated agreements such as the 'Bilateral Agreement between the European Union and the United States of America on prudential measures regarding insurance and reinsurance' could become a thing of the past for Internationally Active Insurance Groups (IAIGs). An association of insurance authorities from more than 200 countries, the International Association of Insurance Supervisors (IAIS) has been working since 2013 to develop a risk-based, globally applicable capital standard (Insurance Capital Standard – ICS). The overall objective is to establish an overarching regulatory framework for large international insurance groups, complete with minimum standards for risk assessment and the resulting capital requirements. This would not only ensure fair competition in international business but would also promote stability on worldwide financial markets and, with this, protection for policyholders (German Insurance Association [GDV], 2021).

Worldwide, there are currently 50 groups that classify as internationally active insurance groups. This status is predicated on minimum thresholds for internationality and size. In terms of the criterion of internationality, at a minimum a group must:

- generate premium income in three countries and
- ten percent of gross premium outside the home country.

In terms of the size criterion, at a minimum a group must:

- report USD 50 bn in assets in the last three years, or
- USD 10 bn in gross premium in the last three years (IAIS, 2022).

The ICS is currently in the observation phase. This began in 2020 and is expected to conclude at the end of 2024. In addition to the data analysis of the ICS, the use of alternative methods and internal models will be examined during this phase. To this end, participating groups report to local oversight authorities in the second quarter of each year. The information is then forwarded to the IAIS during the third quarter. Based on the findings gathered, the ICS is then adjusted in the fourth quarter. Implementation of ICS 2.0 is planned for 2025. The standards of the IAIS are not legally binding, however. They can only be made binding if incorporated in local law (BaFin, 2018). This makes it paramount for as many internationally active insurance groups as possible, together with their oversight authorities, to participate in the observation phase of the ICS.

It is in the nature of things that the effort to develop a global capital standard entails a reconciliation of the interests of many different jurisdictions with different systems of their own. In Europe, for example, the consolidation method is the preferred method for calculating group capital under Solvency II; in the United States, on the other hand, the group capital calculation employs the aggregation method.

Both Solvency II and the ICS generally use the consolidation method. Consequently, a single, adjusted, market-consistent methodology is applied to a group's business. There are also many similarities in the specifics of calculating capital requirements. The only fundamental difference between ICS and Solvency II involves the calculation of the Prescribed Capital Requirement. Risk modules and sub-modules exist for use in calculating capital requirements. The ICS also has a NAT CAT risk module of its own, however. In the field studies, the ICS identifies hazards here that go beyond those considered under Solvency II, particularly where global differentiation is concerned. Due to a broader geographical classification in other sub-modules, where non-European or internationally diversified portfolios are considered, capital requirements under ICS can quickly be lower than they would be under Solvency II (DAV, 2019: 18).

The United States, on the other hand, takes an alternative approach to the ICS. In principle, the capital requirements for insurance groups must be calculated using the Group Capital Calculation introduced and implemented in 2021 (NAIC, 2021). Unlike ICS and Solvency II, the Group Capital Calculation uses the aggregation method. Here, capital requirements are calculated in three steps. First, the existing capital requirements calculated in the various jurisdictions are used (U.S. Chamber of

Commerce, 2019: 30 et seq.). This already presents a fundamental difference to the consolidation approach under the ICS and Solvency II, as capital requirements for each jurisdiction are not calculated in the same way, pursuant to a standard-formula approach (or an internal model). In a second step, scales are calculated for all jurisdictions to extrapolate the companies' respective capital requirements throughout the jurisdictions to a uniform level. In a third step, the individual capital requirements are aggregated at group level (U.S. Chamber of Commerce, 2019: 30 et seq.). It becomes clear that the scales constitute the essential element of the alternative approach used in the United States. Thus, extensive tests are currently being performed in an effort to employ methods to specify scales that will provide a result comparable to the capital requirements under the ICS. As IAIS emphasises: 'Comparable outcomes to the ICS means that the Aggregation Method (AM) would produce similar, but not necessarily identical, results over the trigger supervisory action on group capital adequacy grounds' (IAIS, 2019). This wording – 'similar, but not necessarily identical' opens up broad scope for interpretation.

Not least for this reason, French and internationally active insurance groups have opted not to take part in the observation phase of the ICS for the time being. Specific concerns exist around applying different calculation methods that do not lead to comparable results, and about imprecision in their application. Ultimately, however, the question will not be whether an approach offers certain benefits or drawbacks, but rather how best to coordinate the approaches with one another. A possible question for Europeans concerns coming to terms with and accepting that the alternative U.S. approach is equivalent to the ICS as part of the effort of establishing a global capital standard as a level playing field.

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## Discussion

- What is the reason for the alternative U.S. approach?

The main reason for the alternative U.S. approach is that the group capital calculation, as a method to calculate the capital requirements of American insurance groups, was introduced in 2021 and implemented in 2022. There is no indication of an effort to seek a new change in calculation methods.

- Where did the initiative for the ICS come from?

The initiative for the ICS came from the IAIS. Since 2013, and with membership from more than 200 countries, the International Association of Insurance

Supervisors has worked to develop of a risk-based, globally applicable capital standard.

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15<sup>th</sup> Annual Meeting of the Förderkreis Rückversicherung  
[Sponsoring Group Reinsurance]  
Researchers' Corner, 24 June 2022

Developments in Chinese Online Insurance 2022

Lihong Wang, M.Sc. / FCII

Introduction

Online insurance has evolved from a pure distributional channel to a technology-embedded ecosystem in China. With the impact of COVID-19 and the lockdowns, by the end of 2020, more than 140 Chinese insurance companies had launched online businesses, generating about 6% of the industry total, according to the May 2021 report by Chinese regulators (CBIRC).

Growth of Online Insurance in China

With the ongoing demographic changes (i.e., an ageing population, declining fertility, and the previous one-child policy) and China's more than 850 million active mobile users, online insurance is set to be the mainstream distributional and operational model.

In 2021, the insurance premiums of Chinese online insurers reached 292 billion yuan. After years of significant growth between 2014 and 2016, the value of premiums decreased in the following two years. However, in 2021, the online personal insurance market recovered and grew by around **38 per cent**.



Source: Insurance Association of China

Online Insurance in China

Socioeconomic

As in the West, the demand for protection of assets and life/health grows with an increase in wealth, a decline in fertility and an ageing population.

Entrepreneurship

A total of 7,741 enterprises involved in online insurance were registered with Chinese authorities in 2020, according to a data report.

Macro Environment

Evolving Regulations

With the changes in the insurance sector, regulators are quickly identifying problems and changing laws to tighten loopholes.

Technologies

The availability of advanced technologies forces insurers to operate in a fully digitized and AI-enabled environment in order to save time and money.

Challenges that Online Insurers Face

Regulations

Since August 2021, the CBIRC has issued new laws and regulations to counter irregularities in the online insurance sector, making multiple corrections and deadlines for companies to comply, or alternatively face fines and shutdowns.

Qualified advisors

With the unprecedented demand, there is a major shortage of insurance professionals, which are expensive to recruit and train. The growth of online insurance requires a supply of educated graduates, as well as continuous professional development (CPD) programmes.

Fraud

The increase of fraud operations by the insured or third parties through insurance has impacted personal insurers, especially, challenging the claims procedures. The costs of combating fraud are significant and necessary to the effort to meet regulatory requirements and profit projections.

Global Recession

The negative economic outlook puts pressure on corporations and individuals in respect of their spending. The insurance industry is facing the challenge of rising costs that are proportionally higher than operational profits.

Summary

The rise of online insurance is one of the key trends in insurance development in China. With the aid of advanced technologies, it is the fastest growing line of business. Despite multiple challenges, several significant socioeconomic factors will continue to drive online insurance growth.

# 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance

**Researchers' Corner, 24 June 2022**

## **Developments in Chinese Online Insurance 2022**

**Lihong Wang, M.Sc. / FCII**



My name is Lihong Wang; I work for an independent Lloyd's Broker 1065, International Risk Solutions Limited, based in London. I am also responsible for our European office in Cyprus. I have been working as a part-time researcher at the Cologne Research Centre for Reinsurance for 12 years.

The research project 'Developments in Chinese Online Insurance 2022' is part of a series of research topics I have been doing over the years, including the 2019 'China InsurTech Development' project. Three years on, it is an excellent opportunity to give an update, especially with COVID-19 and the lockdowns' impact.

In the following, I will give you some introduction and statistics on the online insurance premium development, some macro-environmental analyses and show the drivers and challenges for further growth. Finally, I will draw a conclusion in the summary.

Online insurance has evolved significantly in China. It started as a pure distribution channel and has now developed into a complex, technology-embedded ecosystem in the past eight years. According to the Chinese Insurance and Banking Regulatory Commission (CBIRC), the gross premiums for online insurance exceeded 290 billion yuan, equivalent to 45 billion US dollars, in 2021. This accounted for around 6% of the market total in the same year.

The most significant factor was China's 850 million active mobile users, some of whom were keen on online products and services, especially during the lockdowns.

By the end of 2020, more than 140 insurers had launched online insurance and expanded their products from motor insurance to multiple other lines of insurance business. The market has also seen an increasing number of third-party administrators, claims handlers, application developers, and others that provide services to insurers and insured.

The premium development is shown in the graph of the presentation. After years of significant growth between 2014 and 2016, the value of premiums decreased in the following two years. However, the online personal insurance market recovered and grew around 38 per cent in 2021 compared to the previous year. The gross premiums reached nearly 300 billion yuan, equivalent to 45 billion US dollars. This accounted for around 6% of the market total in the same year.

### The background and the big picture

By now, you would ask the same questions about why online insurance has grown so significantly and why demand is so high. I looked at some of the driving factors in the macro-environment, such as socioeconomic reasons, regulations, technologies, and human factors.

Online insurance is given an excellent chance to grow due to the increase in wealth and a fundamental change in society, including the decline in the birth rate, and an ageing population, which drive the demand for insurance as people seek measures to protect their assets and liabilities and manage their healthcare costs and expenses. The current insurance penetration and density are still very low in comparison with Western countries, although China has become the second-biggest economy. The rising middle class will be the driving force behind the growth.

The advanced technologies, for example, artificial intelligence, big data, fintech, and blockchain, lower the barrier and speed up entry into the markets, so that insurers can operate in a fully digitalised environment and easily manage the life cycle of insurance products. The digital engagement of the customers enables their insurers to transact the premiums and claims at low cost and with high efficiency.

As an emerging business model, the pioneering companies face fewer challenges in compliance and fewer restrictions, for instance in marketing, solvency ratio, and product filing. With these changes in the insurance sector, regulators are quickly identifying problems and changing laws to tighten loopholes.

The human factor refers to the entrepreneurship of Chinese enterprises. A data report from Qichacha, a data and analytics firm, reported a total of 7,741 enterprises registered with the authorities to transact and be involved with online insurance in 2020. A big influx of talents from commercial, finance and IT will improve the online insurance infrastructure, so that it can further accelerate growth and maturity.

Although there are several factors mentioned above for the future growth of online insurance in China, there are some short- to medium-term challenges that the sector is currently facing.

### Changing regulations

Since August 2021, the CBIRC has issued new laws and regulations to counter irregularities in the online insurance sector, making multiple corrections and deadlines for companies to comply, or alternatively face fines and shutdowns. The new rules include, amongst others, restrictions on misleading marketing, unauthorised products or unlicensed operations, and close monitoring of the solvency level and claims handling of online insurers. The government has also called for better data- and privacy-protection laws and regulations. In 2022, CBIRC also set out a new issue of risk warning on outsourcing and related-party transactions.

### Shortage of qualified advisors

With the unprecedented demand, there is a major shortage of insurance professionals, which are expensive to recruit and train. As a result of emigration out of the big cities, recruiting new hires has become more difficult. The growth of online insurance requires a supply of educated graduates, as well as continuous professional development (CPD) programs. As I mentioned in the previous research project, due to the rising middle class and its impact on insurance, many young workers moved out of the first-tier cities and coast region into second- or third-tier cities or the western part of the country, leaving rather a serious shortage of skilled workers in the insurance companies.

### Increasing third-party fraud

The increase of fraud operations by the insured or third parties through insurance has impacted personal insurers especially, in respect of claims procedures. The costs of combating fraud are increasing and deemed necessary to meet the regulatory requirements and profit projections. Online insurance is prone to the risk of digital fraud, identity theft, and other cyber crimes. Online fraudsters are difficult to track down, but the Ministry of Public Security in China has seen a steep increase in fraud cases investigated by Chinese police.

### Global recession

Last but not least, the negative economic outlook worldwide puts considerable pressure on the spending of corporations and individuals. The insurance industry as

a whole is facing a slower growth rate than in previous years, and also faces the challenge of rising costs that are proportionally higher than operating profits.

The rise of online insurance is one of the key trends in the insurance sector in China. It is the fastest-growing line of business based on the aid of advanced technologies related to InsurTech. Despite multiple challenges, several significant socioeconomic factors will continue to drive online insurance growth.

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## Discussion

- China insurance market share: Do you have comparative figures for other insurance markets?

At the time of my presentation, I did not have the statistics or development details for other countries. This is due to the unique growth rates in China, and I only looked at Chinese data in the past ten years.

There has been very limited information and segregation reporting in other countries, with the exception of the UK. The value of online insurance premiums was estimated at extremely stable rates of increase for motor, property, life, and health insurance in the UK for the past years. The growth rates will also remain similar to inflation or indexation.

- Which are the principal lines of business for online insurance in China?

Motor, life and health & accident insurance are the principal lines of business. However, there are some new products such as pet insurance, household insurance, travel insurance, flight delay and parcel return insurance. Health insurance remains one of the high-growth areas.

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Would you like to comment or ask any questions? Please feel free to contact Lihong Wang (Lihong.wang@th-koeln.de).

15<sup>th</sup> Annual Meeting of the Förderkreis Rückversicherung  
[Sponsoring Group Reinsurance]  
Researchers' Corner, 24 June 2022

Retrocession within an  
ESG-compliant business orientation

Jörg Dirks, M.Sc. / FCII

- ESG (Environmental Social Governance) criteria are to be understood as a broader term for CSR (Corporate Social Responsibility)
- Contribution to sustainable development by the business community
- BaFin, EIOPA, Green Deal & EU taxonomy
- Principles of Sustainable Insurance/UNEP
- Net-Zero Insurance Alliance

**Environmental (Umwelt)**

- Klimaschutzstrategien
- Umweltschutz
- Emissionsreduktion
- Biodiversität
- [...]

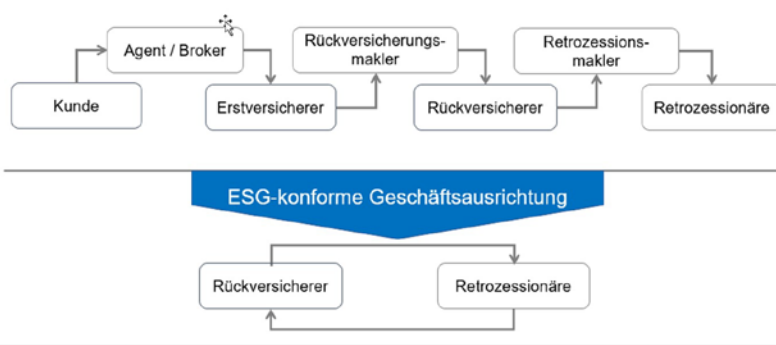
**Social (Soziales)**

- Menschenrechte
- Gesundheitsschutz
- Arbeitsicherheit
- Faire Arbeitsbedingungen
- [...]

**Governance (Aufsichtsstrukturen)**

- Compliance
- Risikomanagement
- Ethisch vertretbare Unternehmensführung
- Verhinderung von Korruption
- [...]

Analyse der potenziell vorhandenen ESG-Risiken



The influence of ESG in retrocession:

- Investment strategy
- Underwriting
- Appetite for risk
- Product development



Advantages & disadvantages

- Recalibration of appetite for risk
- ESG rating
- Competitiveness

Retrozedenten vs. Retrozessionäre



Taking ESG risks into account:

- Business strategy
- Internal governance structures
- Risk management
- Pricing

# **15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance**

**Researchers' Corner, 24 June 2022**

## **Retrocession within an ESG-compliant business orientation**

**Jörg Dirks, M.Sc. / FCII**

Jörg Dirks (M.Sc., FCII) is a full-time underwriter at Hannover Rück SE, where he works in the field of 'Retrocession & Capital Markets'. He is also an employee of the Cologne Research Centre for Reinsurance at the Cologne University of Applied Sciences, where his research focusses on topic of retrocession within an ESG-compliant business orientation. The emphasis here is specifically on the opportunities and challenges that result when considering ESG criteria within a business organisation, and the ways in which these criteria affect retrocession.



The impacts of climate change are increasingly making issues of sustainability a focus for firms and the general populace. With public debate around the use of resources, or concerning fairer working conditions, spurring attention to this topic, firms find themselves confronted with criteria of sustainability. As large institutions in particular, such as BaFin, EIOPA and the EU Commission, are advancing the ESG agenda, the insurance sector must also deal with the criteria.

With the creation of the Net-Zero Insurance Alliance (NZIA), leading primary insurers and reinsurance firms have joined forces at the initiative of the United Nations (UN) to help transition to a climate-neutral economy by changing practices in underwriting, claims processing and risk management. In line with the targets of the Paris Climate Agreement, they want to convert their insurance and reinsurance portfolios to 'net-zero greenhouse gas emissions' by 2050 (Assekurata et al., 2021).

Sustainability criteria are subsumed under the acronym 'ESG' and are thus not confined to climate change. In essence, what are known as 'ESG criteria' are defined as a standard of sustainable investing in the fields of Environment, Social and Governance (cf. Haberstock et al., 2019).

Primary insurers and reinsurance companies alike, as well as retrocession partners and investors, are increasingly incorporating aspects of sustainability into their business decisions. They take the sustainability of investments of capital into account, for instance, along with relevant decisions in a contractual partner's underwriting or social commitment. This is why a convincing sustainability profile can also gradually evolve into a competitive edge.

Companies that neglect this issue must fear reputational damage as a consequence. Across-the-board consideration of the concept of sustainability in a business model of a primary insurer or reinsurance firm is thus quite extensive and touches upon nearly all of the relevant divisions of a company (cf. Faber et al., 2021).

The core business of the reinsurance sector is constantly shaped by new risks and global challenges.

An ESG-compliant business orientation extends far beyond investing processes. ESG criteria must be increasingly integrated into the underwriting processes as well.

An ESG-compliant business orientation and a corresponding adaptation to underwriting presents fresh challenges for the reinsurance and retrocession market, as certain ESG criteria present a hurdle to ongoing business activities in underwriting. Specifically, the discrepancy between competitiveness and the principles of good corporate governance needs to be carefully analysed. Implementing an ESG-compliant business orientation in retrocession goes hand in hand with a recalibration of the appetite for risk and with the inclusion of uniform future ESG ratings that can lead to both advantages and disadvantages in competitiveness.

If one compares ESG factors between retrocedants and retrocessionaires, it can be said that ESG factors are important for retrocedants in the search for capacity. These factors are less important, on the other hand, to the supply of capacity for retrocessionaires. This is borne out by the fact that, as retrocedants already have to deal with ESG criteria during upstream underwriting of the incoming risks, they already have a more complete overview of these factors. Retrocedants also have to deal in detail with possible retrocessionaires and their ESG strategy as part of an effort to maintain an ESG-compliant business orientation.

An ESG-compliant business orientation and consideration of ESG risks inevitably leads to adaptations in business strategy, internal oversight structures and risk management, and to a change in the pricing of retrocession risks.

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## Discussion

- We note considerable differences in approach in the primary insurance market, in the reinsurance market and in the retrocession market. The further along the value chain a stakeholder happens to be, the less transparent the risks it covers. Is ESG as a topic viewed as a ripple in the value chain, beginning first in primary insurance and ending in retrocession, and thus perhaps no longer as pronounced?

The ESG issue is not viewed as a uniform ripple along the entire value chain. Particularly in the business relationship between retrocedants and retrocessionaires, ESG criteria take on a new, separate meaning, which is why one can rather speak of a separate, second ripple. Moreover, there are other factors that play an important role in retrocession and the search for capacity – factors that do not equate with underwriting in the inward area of a reinsurance firm.

- What chances does a retrocessionaire have to comport itself in an ESG-compliant manner if it does not view its retrocedants globally, as the retrocessionaire cannot view the world-wide portfolios in detail? How does the reinsurer position itself to act in an ESG-compliant manner?

The retrocedant must orient itself strategically in advance in order to see whether the retrocessionaire also meets the ESG criteria. Both parties need to address this issue to ensure uniform transparency.

- Might ESG ratings lead to changes in pricing or to an advantage in pricing?

If a positive ESG rating (by established rating agencies) exists, this also results in pricing advantages (both as an advantage in traditional reinsurance and in the retrocession sector).

For retrocedants and retrocessionaires alike, detailed evaluations of ESG ratings tend to be uniformly rooted in risk management and in contractual arrangements.

The thesis is based on the fact that a positive corporate rating of 'AAA', for example (e.g. by S&P) can lead to better loan terms than a 'BBB' rating can. Moreover, a more favourable ESG rating would also promote a better reputation for both retrocedants and retrocessionaires.

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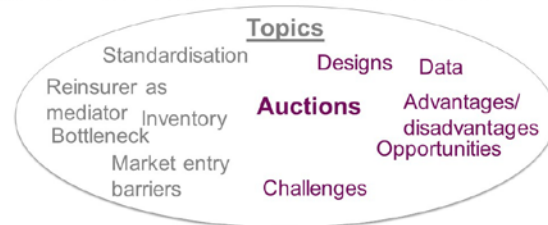
## Classic reinsurance placements and auctions – we know that we know nothing

Robert Joniec, M.Sc. / FCII / PhD cand.

### Theoretical background: Market design (lecture '21)

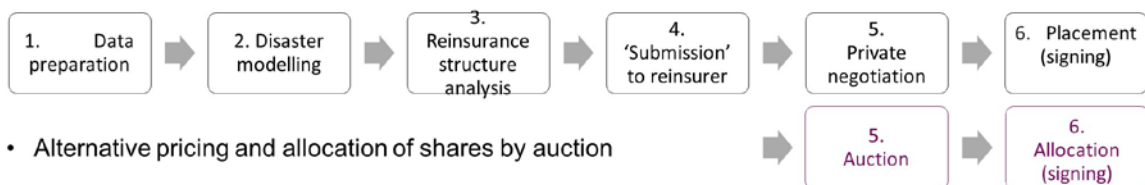
Market design is a discipline in economics that combines the architecture of a market with its goals and builds on game theory

- Market rules (allocation mechanism) influence behaviour and hence the overall outcome
- Labour market, mobile network, organ transplants, financial markets ... reinsurance



### Reinsurance transactions (NatCat)

- The design of reinsurance transactions eliminates information problems between insurers and reinsurers
- In classic reinsurance transactions, how motivated are reinsurers to disclose the expected returns?
  - › Competition alone is not a decisive argument; cf. market design and auction theory
- Classic and alternative reinsurance transactions are based on the classic transaction design



### Reinsur. contracts as auction items

- *Common value* → actuarially expected loss
- *Private value* → covariance with reinsurer inventory
- *Multi-unit* → divisible homogeneous units
- Bidders with heterogeneous and limited capacities ('leading' reinsurers and 'followers')
- Inelastic demand (Weiss & Chung 2004)
- Convex cost of capital (Froot & O'Connell 2008)
- Knowledge transfer

### Auction features

- Unit prices vs. individual prices in the panel
    - › Unit prices potentially wrongly preferred in the past (see Binmore & Swierzbinski 2000)
  - Public vs. private auctions
    - › Collusion vs. strategic uncertainty (see Binmore & Swierzbinski 2000; Rothkopf & Harstad 1995); consensus-building and lowering barriers to entry
- Reinsurance auction platforms:
- › Aon, Guy Carpenter, Tremor, (Ausubel)

### We know that we know nothing – an outlook

- › Are negotiations or auctions 'better'? (see Bulow & Klemperer 1996)
- › Technological progress and more cost-effective 'environments' reduce prices in the long term
- › Focussing research on transaction rules (see Madhavan 2000; Budisch, Cramton & Shim 2015)
- › Better grasp of design, taking climatic and socio-economic urgency into account.

# 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance

**Researchers' Corner, 24 June 2022**

## **Classic reinsurance placements and auctions – We know that we know nothing**

**Robert Joniec, M.Sc. / FCII, cand. PhD**



Robert Joniec has been a part-time member of member of academic staff at the Cologne Research Centre for Reinsurance since 2017. In addition, he is a PhD student at the University of Limerick and is investigating the influence of alternative risk transfer on the market for reinsurance. His main occupation is as a member of the Strategic Advisory EMEA Team at Guy Carpenter & Company GmbH.

Following last year's research topic, this year's research will continue to focus on market design in the reinsurance context. Market design is a research field based on game theory in which the architecture and customs of a market are associated with its aims. Central to this research is the way in which design affects market participants' behaviour. The increasing supply of auction platforms for reinsurance underscores (unanswered) questions concerning the relationship between design and outcome in reinsurance.

As the case of reinsurance of natural disasters (NatCat) shows, the objective of key elements of classic reinsurance transactions is to reduce information disparities between primary insurers and reinsurers (see Fig. 1). Still, the question of how much the classic transaction process motivates reinsurers to disclose private information in the form of offers and to strengthen an equilibrium remains to be decided. Competition alone is not a decisive argument from a market-design point of view (Agarwal and Budish, 2021). The platforms currently available for reinsurance auctions use the same steps, 1. - 4., as traditional NatCat reinsurance transactions, but they differ in terms of the final steps of pricing and allocation (see Fig. 2). There is no indication in the reinsurance literature at this point in time that would suggest a grasp of how the classic transaction process affects results, nor how auctions vary in their effects / how these affect results. Thus, an important aim is to lay the foundations for the future development of a discussion of market design in the reinsurance context.

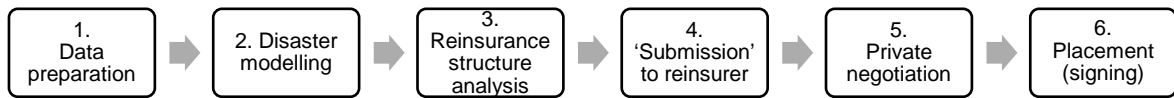


Figure 1: Simplified transaction process, classic NatCat reinsurance

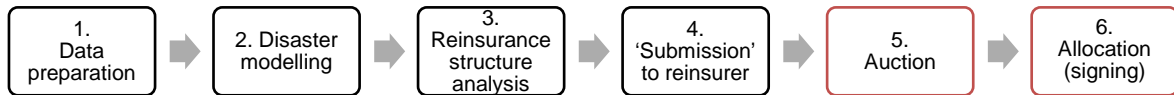


Figure 2: Simplified transaction process NatCat reinsurance auction

The availability of reinsurance auctions in practice has already bridged the gap between reinsurance and auctions, and the literature on auctions can be consulted. Reinsurance contracts must first be defined as auction items, however. The value of reinsurance contracts stems from two elements: first are what are known as the ‘common values’ that are generally applicable and can be described in terms of expected actuarial loss. The second element is referred to as ‘private values’ – values that depend on the respective bidder. An example of this is the covariance seen between the expected loss of the reinsurance contract and that of the already existing reinsurance portfolio of a bidding reinsurer (Goeree and Offerman, 2003). Above and beyond this, reinsurance contracts are placed / acquired in homogeneous and divisible units. In addition, bidders (reinsurers) have heterogeneous and limited capacities; the demand for reinsurance is inelastic (Weiss and Chung, 2004); insurers and reinsurers experience convex costs of capital (Froot and O’Connell, 2008); knowledge transfer can also form an important element of the transactions. Additional, relevant properties can presumably be listed, but this would be the work of further investigations.

The designs for auctions of similar goods were considered with a view to the characteristics described. This shows that universally applicable positive characteristics of auctions can be formulated only in certain cases. Hence, it is currently not clear whether, and in which circumstances, unit prices or individual prices would lead to better results for the sellers (insurers). Central banks in particular strongly advocated for uniform prices in the past until researchers called this into question again (Binmore and Swierzbinski, 2000). It remains unclear whether public auctions or blind auctions would lead to better results. The main argument for the former is the avoidance of collision, whereas the latter permits a reduction in strategic uncertainty (Rothkopf and Harstad, 1995; Binmore and Swierzbinski, 2000). Public auctions in the reinsurance setting would also allow for consensus-building and

permit a lowering of barriers to entry for other bidders. At this juncture, however, a possible change in the expected bidders that such a decision could involve must be taken into account. Said characteristics (unit prices, individual prices, public bidding, blind bidding) can be found in the reinsurance auctions currently offered by brokers AON and Guy Carpenter and through platform provider Tremor Technologies Inc. An auction design that approximates classic broker placement is the Ausubel auction (Ausubel, 2004). Some parallels are already discernible here, but the differences that remain make it impossible to draw conclusions about suitability for reinsurance placement. This shows that it still remains to be seen how auctions will affect placement in reinsurance.

Returning to the initial question of how the classic design of the reinsurance market affects placement success, and how auctions compare to this, the following findings are thus clear: For both types of placement, there are currently no insights into connections between market design and expected placement success (equilibrium). Moreover, no general observations can be made as to whether classical placement or auctions constitute better allocation mechanisms (cf. Bulow and Klemperer, 1996).

While the effects of technological advancement and reduced cost will lead to price reductions in reinsurance – regardless of design – research from other areas stresses that the focus should be on transaction rules, not transaction environments (Madhavan, 2000; Budish, Cramton and Shim, 2015). If climatic and socio-economic trends are taken into account, it is clear that a better understanding of the relationships described is an increasingly urgent element of the effort to strengthen the reinsurance market. In the transition to the discussion, the first question raised concerned the extent to which the audience had already dealt with this topic, and what some of the experience in this regard has been to date.

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## Discussion

- Which points should be taken into account in the auction format?

Reinsurance is a complex product and should not be reduced to considerations of price alone. Debates on the topic often fail to consider contractual clauses specifically – and thus the quality of cover involved. All of the participants in the discussion confirmed these points as well.

- To what extent do the steps involved in classical transaction design need to be adapted when auction theory is applied?

Transaction steps 1. – 4. contain a considerable effort to reduce informational asymmetries. Hence, they are foundational elements that are still required when auctions are used. Where auctions are concerned, the significant difference to classic transaction design can be found in steps 5. Auction and 6. Allocation.

- Which aspect offers the greatest benefit for the auction formats?

The greatest benefit is transparency around how the supply and demand sides interact, but this is only the case with the heavily standardised products, such as Industry Loss Warranties. It was pointed out, however, that there are currently no convincing arguments for the use of auctions for the vast majority of classic reinsurance contracts.

With a view to the discussion, it is clear that while such issues are highly relevant, they are not yet reflected in research. This underscores the fact that that a large share of reinsurance transactions in the years to come will still be conducted within the confines of the traditional reinsurance process, with no certainty whatsoever about interactions between rules and practices and the objectives of the reinsurance market. The same applies to the emerging alternatives.

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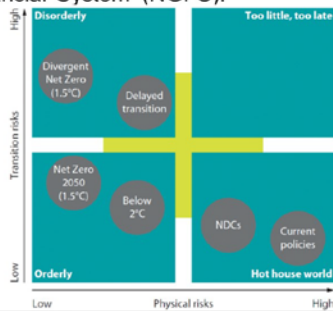
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Researchers' Corner, 24 June 2022

Accounting for climate-change scenarios in the ORSA

Wolfgang Koch, M.Sc. / FCII

- According to the German Federal Financial Supervisory Authority (BaFin), climate-change scenarios in the ORSA are a focus for oversight this year
- Specific EIOPA/BaFin requirements:
  - Proportionality principle (depending on the companies' risk profile)
  - At least two long-term (min. 30 years) scenarios of temperature increase (< 2°C and ≥ 2°C)
- The disclosures required in ORSA are currently under discussion (e.g. GDV working group)

1 Scenario selection by the 'Network for Greening the Financial System' (NGFS):

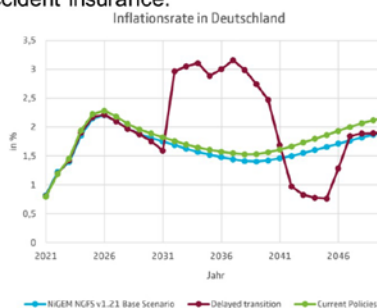


2 Different methodological approaches for assessing climate scenarios:

- Revaluation as of today (sensitivity analysis)
- Stress test with instantaneous shocks ('time travel')
- Projection (static or with management rules)

Bestand	per	Zukunft	Bilanz	SCR	GSB
2021	2021	Referenz	vorhanden	vorhanden	vorhanden
	2021	Szenario_1	neu	neu	neu
	2021	Szenario_2	neu	neu	neu

3 Impact on investment, personal and non-life/accident insurance:



4 Critical discussion:

Kürzerer Zeithorizont	Längerer Zeithorizont
– Eigenmittel	– Strategie und Geschäftsmodell
– SCR	– Geschäftsbetrieb
– Gesamtsolvabilitätsbedarf	– Anpassungsfähigkeit

↓  
Mögliche Maßnahmen und Managemententscheidungen

Source:  
German  
Insurance  
Association  
(GDV)

- ORSA 2022: simple, quantitative analyses as a basis for deriving qualitative statements
- The climate-change scenarios developed by the NGFS can serve as a guide
- Investing: Particularly characterised by transition risks
- Personal insurance: Long contract terms
- Non-life/accident insurance:
  - Short-term adjustment options (premiums, scope of cover, etc.)
  - The frequency and losses due to natural hazards will increase
  - Changes due to amended construction law (climate-conscious construction)

# 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance

Researchers' Corner, 24 June 2022

## Accounting for climate-change scenarios in the ORSA

**Wolfgang Koch, M.Sc. / FCII**

Wolfgang Koch (M.Sc. / FCII) works full-time in risk management at Deutsche Rückversicherung AG. He is a part-time member of academic staff at the Cologne Research Centre for Reinsurance.



Consideration of the topic of 'Accounting for climate-change scenarios in the ORSA' was deemed useful, since climate-change scenarios are set to be considered in the ORSA report for the first time this year and BaFin has repeatedly addressed the fact that consideration of climate-change scenarios in the ORSA will constitute a focus for oversight this year (cf. EIOPA, 2021a).

Previously known, specific EIOPA/BaFin requirements are that the principle of proportionality will apply, depending on the risk profile of the firms involved. At least two long-term scenarios for temperature rises over a period of at least 30 years must be presented as well. One scenario will factor in a temperature rise of less than 2°C, and another scenario will envision a temperature increase equal to or greater than 2°C (cf. BaFin, 2021). The disclosures required in ORSA are currently under discussion in the companies. What follows presents a possible approach that was discussed in the GDV working group, among other forums.

First, a selection must be made from among the scenarios; the scenarios developed by the 'Network for Greening the Financial System (NGFS)' would be suitable for this purpose and are presented in the following framework:

The NGFS is a group of central banks and financial supervisory authorities formed to promote conversation around climate and environmental risk management. An advantage of the climate-change scenarios developed by the NGFS are that they currently constitute the standard for regulatory stress tests and scenario analyses, with data made available to the public and regularly updated or broadened. All of the scenarios drawn up by the NGFS are based on climate science. They are also based on the latest climate models and supplemented by macroeconomic and socio-economic modelling (see Network for Greening the Financial System, 2021). To meet

BaFin requirements, it makes sense to select from the NGFS framework a scenario with a high physical risk (e.g. the 'Current policies' scenario) and, on the other hand, a scenario with a high transition risk (e.g. the 'Delayed transition' scenario).

In the next step, the climate scenarios selected must be methodically assessed. On the one hand, in-house working groups could conceivably be constituted to conduct a qualitative risk inventory for capital investment and actuarial practice. Methodologically speaking, a re-valuation as of today (sensitivity analysis) would be conceivable, for example. The existing balance sheet would then be used as a reference scenario without projection. Under the neutral reference scenario, there would be no interference with climate policy, but there would be no observable future temperature rise, either. The initial scenario is then compared with the narrative of the two selected scenarios (e.g. 'Current policies' and 'Delayed transition'). In this regard, proposals have already been put forward as to how the narrative of the scenarios could be implemented quantitatively (cf. GDV, 2021a). The corresponding analysis of sensitivities (impacts due to changes in individual parameters) would then be applied to the balance sheet, the solvency capital requirements and, finally, to overall solvency needs. This would at least permit a certain comparability of the different scenarios.

A sample visualisation of the results for investment can be found in the following graphic, based on the example of the inflation rate in Germany:

In this example, under the 'Delayed transition' scenario (red line), (sudden) intervention in climate policy would occur from 2030, with inflation first rising sharply as a result of rising energy prices. Compared to the baseline scenario (blue line), however, an alignment can be observed that continues through the year 2050. Under the 'Current policies' scenario (green line), on the other hand, there is no intervention in climate policy over the entire period, and inflation consequently rises in the long term versus the baseline scenario (cf. GDV, 2021b).

Ultimately, companies must deal with the results in the ORSA report on a qualitative and, if indicated, quantitative level. In the short term, the ORSA report must address the impact on own funds, SCR and overall solvency needs. In the long term, there is a particular need for consideration of the business strategy and business operations.

Overall, simple quantitative analyses are expected to serve as a basis for the ORSA 2022 in an effort to derive qualitative statements based on them. But as the supervisory authority has already indicated in this connection, a trend towards quantitative analyses in the ORSA in the coming years is desirable. During the first year, the climate-change scenarios developed by the NGFS can serve as an initial guide. With many companies likely to follow this approach, this will also achieve comparability between companies.

Special features will be observable for the various business lines. As the case of inflation shows, capital investment is influenced by transition risks in particular. In the case of personal insurance, the climate will change during the relatively long contract terms, and this will have corresponding effects on the contracts. In non-life/accident insurance, there tend to be options for short-term adjustments in terms of premiums or scope of cover. In addition to the increasing frequency of and claims arising out of natural hazards, changes due to the reformed construction law (climate-conscious construction) will have profound impacts on construction costs, and thus on the constitution of reserves in insurance companies as well (cf. DAV, 2021).

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## Discussion

- BaFin has already announced that companies with a low risk profile do not have an obligation to identify scenarios in the ORSA. Have specifications been defined to indicate when this applies to these companies?

According to BaFin, companies with a weak risk profile (future LRPU) are exempt from implementing (long-term) climate-change scenarios in the ORSA and from justifications in case of insignificant risk of climate change. If climate-change risks are significant for companies with a weak risk profile (LRPU), the ORSA report must at least indicate the extent to which they are exposed to climate-change risks, and what climate-change-based medium-term effects they expect for their future trend in claims, their capital needs and their investments, and how they intend to respond to these. Unfortunately, no limits are known in this regard. Consequently, during the first year, LRPU companies must argue effectively, and the feedback obtained from supervisory authorities will be relevant to the effort to extrapolate the future course of action.

- In the context of natural-hazard insurance, compulsory insurance is under consideration; in the long term, this would more than double insurance density in this line (parallel to an increase in the numbers of claims due to climate change). Shouldn't insurers then take care to insure fewer properties in future than currently permitted in the zones of the German system of flood-risk classification [ZÜRS]?

Thus far, of course, it has been difficult to predict whether state specifications might be instituted in this regard in future. Where appropriate, stronger conditions as to what may and may not be insured would have to be imposed for constructional requirements in underwriting (with a corresponding impact for reinsurance as well). It would also be conceivable for the insurer to be able to

agree in the short term to a security obligation that is independent of state specifications.

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15<sup>th</sup> Annual Meeting of the Förderkreis Rückversicherung  
[Sponsoring Group Reinsurance]  
Researchers' Corner, 24 June 2022

Limits of (re)insurance cover –  
An analysis of exclusions of cyber-conditions

Frank Cremer, M.Sc. / PhD cand. / FCII

Motivation and point of departure

Financial loss due to cyber risk is increasing

- Cybercrime is estimated to have caused around \$1 trillion in damage to the global economy in 2020<sup>1</sup>
- In Germany, the damage caused by cybercrime in 2020 totalled to approx. EUR 223 billion<sup>2</sup>
- According to Lloyd's, the Cyber Risk Protection Gap currently stands at approx. 90 percent<sup>3</sup>

[1] Maleks Smith et al. 2020  
[2] BitKom 2021  
[3] Schanz 2018

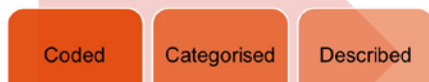
A look at cyber insurance

- The share of cyber insurance premium in the US was less than 1 percent in 2020<sup>4</sup>
- Only 28.4 percent of the cyber claims filed in 2018 were insured<sup>5</sup>

[4] Insurance Institute 2021  
[5] A.M. Best 2018

- Companies do not know or understand their own cyber risks
- Companies do not understand the relevant cyber insurance products

Methodology



Inductive qualitative content analysis according to Mayring



Exclusions and their frequency

Overall procedure

1. Identifying the conditions
2. Creating a data set
3. Analysis
4. Evaluation

Results

Excerpt from the exclusions identified

- War, terror and political hazards (97.5%)
- Infrastructure failure (92.5%)
- Hardware, software data (87.5%)
- Intellectual property and trade secrets (87.5%)
- Losses caused by cyber criminals (57.5%)
- Personal injury and property damage (35%)

Projecting the results to cyber scenarios

- Type of exclusions leaves cumulative risks uninsured
- Scope of exclusions leaves many cyber scenarios uninsured
- For many companies, exclusions constitute gaps in cyber cover that would need to be insured

Summary of the findings

- Only isolated approaches of standardised terms and conditions were identified
- No uniform terms / definitions
- Unclear / imprecise wording
- Insurance cover often fails to reflect companies' need for cyber cover

Conclusions for cyber insurance

- Gaps in cyber insurance currently need to be closed elsewhere
- Policy-makers will become more involved within the scope of risk transfer and cybersecurity
- Solutions are needed to fill insurance gaps

## **15<sup>th</sup> Annual Meeting of Sponsoring Group Reinsurance Researchers' Corner, 24 June 2022**

### **Limits of (re)insurance cover – An analysis of exclusions of cyber-conditions**

**Frank Cremer, M. Sc., cand. PhD / FCII**

Frank Cremer (M. Sc., cand. PhD / FCII) works as an academic staff member at the Cologne Research Centre for Reinsurance. Under a partnership with the University of Limerick, he is completing his doctorate on various aspects of the topic of cyber (cyber risks, risk transfer, cybersecurity). For the Cologne University of Applied Sciences, the doctoral research is being supervised by Prof. Dr. Michael Fortmann.



The frequency and financial impact of cyber damage is increasing from year to year. According to an estimate by Maleks Smith, Lostri, and Lewis (2020), the cost of cybercrime in 2020 stands at around USD 1 trillion. This is estimated to represent a 50% increase over 2018. Similar increases and financial losses, valued at EUR 223 billion, have been identified relative to Germany (Bitkom, 2021).

In 2018, Lloyds of London used scenario-based models to draw up an estimate of the magnitude of the size of the insurance gap with respect to cyber risks. They determined that the insurance gap stands at approximately 90%. The term describes the difference between the insurance cover that is economically required and the insurance cover actually purchased (Schanz, 2018).

On the demand side, cyber insurance plays a rather minor role among policyholders. For example, the share of cyber insurance premium in the US was less than 1% of the total premium of all classes of insurance (Insurance Institute, 2021; FitchRatings, 2021). Along with low demand for cyber insurance products, another problem with cyber insurance is the understanding of insurance cover. A study by A.M. Best (2018) found that only 28.4% of all claims submitted were insured at all.

As the statements made above show, companies either do not know or are unaware of their own cyber risks. Companies that already have cyber insurance also often have difficulties understanding this insurance cover (OECD, 2020). This is why the insurance cover of cyber conditions was analysed in greater detail, with the results

obtained projected onto cyber claims in an effort to gain a better sense of the relationships involved.

This research considers German cyber insurers that offer cyber protection for small and medium-sized enterprises (SMEs). This research considers only the exclusions of cyber insurance policies. Additional, extendible inclusions, perhaps available subject to payment, were not considered. As a basis for this research, a data set based on BaFin information was created. This data set contains all of the insurers subject to BaFin supervision. The initial number of insurers in this data set was 1303. As a next step, these were checked for relevance to the research analysis. In Germany, cyber insurers belong to the non-life and accident insurers' line. The first segmentation step excludes all insurers not included among the ranks of non-life and accident insurers. This reduced the number of relevant insurers to 694. The research then excluded all of the insurers that act as direct subsidiaries. In the last step, the remaining insurers were examined in an effort to determine whether or not they offer cyber insurance. This segmentation reduced the number of insurers to 50. Among these cyber insurers, a review was conducted to determine whether the insurance conditions were publicly available on the website or via e-mail request. This identified 41 cyber insurance conditions that offer cyber insurance for SMEs. These were then summarised in a data set and prepared for analysis.

The research method chosen was the inductive qualitative content analysis according to Mayring, where exclusions of insurance cover derive directly from the text material of the data set (Mayring, 2015). In an effort to reduce the complexity of the qualitative data material, the text segments were coded manually as a first step. This process checked the data material for relevant text segments. These text segments included language such as 'exclusion', 'uninsured risks' and 'are deemed uninsured'. The text segments thus obtained formed the basis for descriptive codes and their inductive categorisation. To test the codes and categories for robustness, a check of approx. 30% of the entire coded text material was performed. With a positive result of this check, the remaining data material was coded. The final categories and a summary description of each were then drawn up.

This analysis identified 15 exclusions and their frequencies in the cyber conditions. These results can already help companies gain a sense of what might not be included under cyber insurance. The descriptions also afford an information base that contributes to a better grasp of insurance cover or exclusions.

Analysis of the results found that the cyber conditions contain only small beginnings of standardised conditions. Hence, while some cyber insurers based their policies on the model conditions of the Gesamtverband der Deutschen Versicherungswirtschaft e.V. (German Insurance Association), they reworded and modified them in various places. A further finding is the lack of uniform definitions. The wording proved imprecise and often left room for interpretation.

The results were also projected onto cyber scenarios of the Advisen Cyber Loss database (Advisen, 2022). In this context, it turned out that many exclusions correlate strongly with each other and with some scenarios as well. In combination, some cyber scenarios also present cumulative risks. For example, the exclusion of war or of infrastructure failure can pose great financial damage to companies, regardless of sector and geographical location. From cyber insurers' point of view, these exclusions are currently justified, as further data and experience are needed to relax the exclusions (Cremer et al., 2022).

Still, the advance of digitalisation will call for solutions to relax limitations on insurance cover, as a significant share of our private and economic lives occur in the digital space. This makes it all the more important for policymakers to take a greater role in cybersecurity as part of the effort to protect these values. This also includes the obligation for companies to work on their own to achieve adequate cybersecurity.

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## Discussion

- What exclusions were identified, and how frequently do they occur?

The exclusions mentioned in the poster represent only an excerpt. The categories of exclusions and their frequencies are determined as follows:

- War, terror and political hazards (97.5%)
- Intentional or reckless acts (95%)
- Infrastructure failure (92.5%)
- Hardware, software and data (87.5%)
- Intellectual property and trade secrets (87.5%)
- Penalties and fines (85%)
- Financial assets (82.5%)
- Affiliates (80%)
- Assumption of liability (80%)
- Nuclear energy (77.5%)
- Losses caused by cyber criminals (57.5%)
- Non-insurable sectors / activities (52.5%)
- Vehicles (50%)
- Force majeure (37.5%)
- Personal injury and property damage (35%)

In this context, it warrants repeating that some exclusions can certainly be included in insurance in exchange for payment of an additional premium. This is not the case for all exclusions, however. This research considered all exclusions for the sake of clarity and completeness.

- Should companies independently set provisions aside for uninsured cyber losses?

Independent formation of provisions entails the risk that the provisions formed might not suffice in the event of a loss. In the context of prevention, the company should establish appropriate cybersecurity and review this at regular intervals to ascertain whether the steps taken are all still up to date. Employees should also receive continuous training, with learning checked using practical exercises, e.g. via test phishing e-mails during work.

- A heretical question: Does insurance like this, with these exclusions, even make sense?

Cyber insurance makes sense, because even smaller companies can no longer manage without appropriate IT and computers as digitalisation continues to advance. Against this backdrop, it is noted that the more a company depends on technology, the greater the financial impact of cyber risks can be. Even if the exclusions for companies seem somewhat extensive, in this context it is important to recall that cyber insurance is not just property insurance but can also be invoked in the event of liability claims. As part of the assistance services, it also aids policyholders in the event of a claim.

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



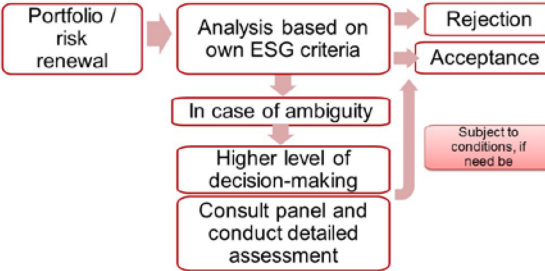

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15<sup>th</sup> Annual Meeting of the Förderkreis Rückversicherung  
[Sponsoring Group Reinsurance]  
Researchers' Corner, 24 June 2022

ESG criteria in reinsurer underwriting

Fabian Lassen, M.Sc. / FCII

Introduction	Challenge for reinsurers	
<ul style="list-style-type: none"> <li>ESG criteria widespread in the investment sector, abundant literature available</li> <li>Approaches are gradually developing in primary insurance underwriting</li> </ul>	 Reinsurer concludes a framework agreement with primary insurer  under which all agreed risks may be underwritten. Reinsurer participates in a portfolio with many risks. <u>Exception</u> : optional reinsurance solutions → each risk is considered individually <i>me</i> How are ESG criteria taken into account?	
Relevance		
<ul style="list-style-type: none"> <li>Regulatory requirements are increasing / reputation</li> <li>Avoiding environmental damage</li> <li>Strengthening human rights (ethical considerations)</li> <li>Corruption</li> </ul>		
What can these criteria be?		
 <b>Environmental</b> <ul style="list-style-type: none"> <li>Greenhouse gas emissions</li> <li>Natural-hazard risks</li> <li>Environmental pollution</li> <li>Biodiversity loss</li> <li>...</li> </ul>	 <b>Social</b> <ul style="list-style-type: none"> <li>Human rights</li> <li>Working conditions</li> <li>Healthcare</li> <li>Preventing slavery, child labour</li> <li>...</li> </ul>	 <b>Governance</b> <ul style="list-style-type: none"> <li>Unethical practices</li> <li>Corruption</li> <li>Lack of transparency</li> <li>Non-compliance with regulations</li> <li>...</li> </ul>
Information procurement	Underwriting process	
<ul style="list-style-type: none"> <li>Underlying information generally available (form of government, political stability, social justice, human rights, working conditions, etc.)</li> <li>Enterprises' ESG ratings can also help → Qualitative findings are summarised in a score</li> <li>Information through primary insurers and transparency about the covered portfolio, e.g. top risks</li> </ul>	 <pre>           graph TD             A[Portfolio / risk renewal] --&gt; B[Analysis based on own ESG criteria]             B --&gt; C[Rejection]             B --&gt; D[Acceptance]             B --&gt; E[In case of ambiguity]             E --&gt; F[Higher level of decision-making]             F --&gt; G[Consult panel and conduct detailed assessment]             G --&gt; D             G --&gt; H[Subject to conditions, if need be]           </pre>	
Conclusion		
<ul style="list-style-type: none"> <li>We are at the beginning of a long transformation → proactive design</li> <li>Create awareness of the topic and promote transparency</li> <li>Consider ESG criteria as a further aspect alongside the actuarial risk</li> <li>Over time, increase requirements for the underwriting decision, e.g. initially increase the need for information, introduce higher levels of decision-making, consult panels</li> <li>Help shape transformation and work together with cedants, reinsurers and brokers on market-specific solutions</li> </ul> <p>› <b>How do you view this topic? How do you approach it in your company?</b> </p>		

# 15<sup>th</sup> Annual Meeting of the Sponsoring Group Reinsurance

**Researchers' Corner, 24 June 2022**

## **ESG criteria in reinsurer underwriting**

**Fabian Lassen, M.Sc. / FCII**

Fabian Lassen (M. Sc. FCII) works as a portfolio underwriter at R+V Re (R+V Versicherung AG), where he is responsible for the Austrian and Swiss markets. He is also a staff member at the Cologne Research Centre for Reinsurance at the Cologne University of Applied Sciences.



The topic of Environmental Social Governance (ESG) has been widely discussed for several years. Many ESG criteria have already been identified for the investment sector, resulting in rules for sustainable investing (cf. CFA Institute Research Foundation, 2020). Approaches to underwriting by insurers also continue to evolve (cf. UN Environment Programme Finance Initiative for Sustainable Insurance, 2020). Some of these approaches are quite vague, however, and often concern the business of a primary insurer more than that of a reinsurer. But the relevance of ESG criteria continues to increase in underwriting by reinsurers as well. On the one hand, reinsurers have an intrinsic motivation to concern themselves with sustainability, as they are directly affected by the impacts of natural disasters. On the other hand, there are extrinsic factors involved as well, such as increasing public interest and growing regulatory requirements (cf. BaFin, 2020). In 2021, for example, the Austrian Financial Market Authority (FMA) analysed ESG scores for the overall market and for individual market participants. Accordingly, the Austrian insurance sector has an ESG score of 73.4 out of 100 points (cf. FMA, 2022).

The challenge for reinsurers is to identify appropriate ESG criteria and embed these in their underwriting. In optional underwriting, each individual risk is considered and assessed; the greater transparency in which this results facilitates implementation. But the major part of the premium volume is taken up by the treaty reinsurance business. Here, primary insurers and reinsurers agree on a framework agreement under which all agreed risks are shared between primary insurers and reinsurers. The reinsurer thus shares in a more or less homogeneous portfolio and has little information about the details of each risk (cf. Liebwein, 2018).

## **ESG criteria**

A large variety of different ESG criteria also affect underwriting. Some criteria can be taken into account more easily than others. Here is a selection of different ESG criteria that could be factored into underwriting (see UN Environment Programme Finance Initiative for Sustainable Insurance, 2018):

### Environmental

- Greenhouse gas emissions
- Natural-hazard risks
- Pollution
- Biodiversity loss

### Social

- Human rights
- Working conditions
- Healthcare

### Governance

- Non-compliance with regulations
- Lack of transparency
- Unethical practices
- Corruption

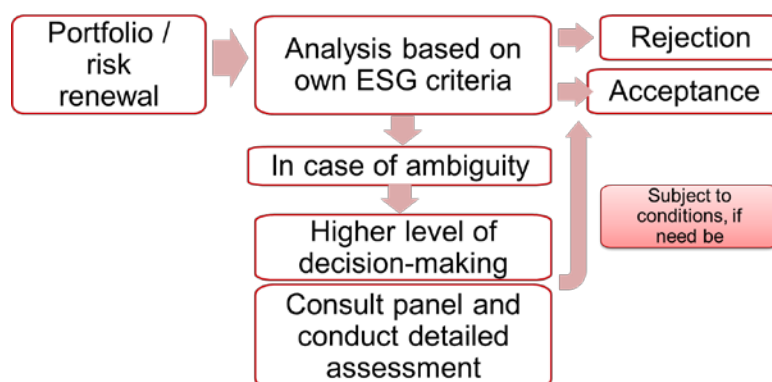
Consider the issue of greenhouse gas emissions: A typical example of this is the withdrawal from coal-based power generation. This can be quickly implemented in optional reinsurance. In contract reinsurance, we continue to face the dilemma that coal power is a basic building block of energy production, depending on the country. If a reinsurer wanted to exclude coal-fired power plants and the associated value chain, business in those countries would then have to be discontinued. If we consider

the social aspects involved, this also concerns a country's political stability and the safeguards for human rights that are in place.

Ultimately, many different aspects can and must be taken into account and weighed up against each other. The first step is to obtain information that in some cases will be available although it was not previously required for underwriting (cf. Norton Rose Fulbright, 2021). Basic information, such as the form of government, political stability, social justice, etc., is usually available. It becomes more challenging in the case of information concerning a primary insurer's business model and the portfolio to be covered. This can quickly become very detailed, and, with a large number of customers and markets, extensive analysis requires a considerable effort. ESG ratings such as S&P or AM Best can be used as support (cf. S&P, 2022; AM Best, 2022). This can be of use as they combine a host of qualitative findings to generate a score. Information and disclosures provided by the primary insurer also help create transparency with regard to the covered portfolio.

### **Incorporating ESG criteria in the underwriting process**

In addition to the underwriting approaches they entail, all the information collected provides an additional basis for deciding whether to underwrite a portfolio/risk or not. For this purpose, a further process can be implemented in underwriting, or the underwriting guideline is extended accordingly. The process can look like this:



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The reinsurer analyses the portfolio to be covered based on transmitted and publicly available information as well as existing ESG ratings. If limits are exceeded, the risk can be underwritten, subject to the approval of a higher decision-making level. Conditions can be linked to the underwriting decision, where appropriate.

It quickly emerges that, where questions pertaining to ESG criteria are involved, we are navigating away from a purely actuarial assessment of risk and towards a

fundamental decision. It is not yet possible to assess how these criteria will affect a reinsurer's business. Ultimately, we are standing at the beginning of a long transformation that we can all help to shape. It begins with the creation of awareness and then progresses to greater transparency. In future, ESG criteria are likely to be considered as a further aspect alongside the actuarial assessment of risk. Stakeholders can help shape the transformation and work on market-specific solutions, alongside cedants, reinsurers and brokers.

The latest events in Ukraine clearly demonstrate how fluid this issue is. While the phase-out of coal was still a matter of course in early 2022, today we are once again talking about a temporary phase-in of coal-fired power generation. What is clear is that this, too, will require insurance cover.

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## Discussion

- How does one deal with old liabilities in the portfolio that date to a time in which ESG criteria were not yet an issue?

The current focus is strongly directed towards newly underwritten risks. Risks that have already been underwritten are protected by contract. Whether portfolios are in for a revaluation is not foreseeable at this point in time. Given current political uncertainties, however, this cannot completely be ruled out.

- We see a reversal in the assessment of weapons of war and nuclear energy in Germany. How can underwriting deal with the volatility currently prevalent in the political environment?

Given the many different strategic orientations and business fields in which (re)insurers are involved, unfortunately no easy-to-follow instructions can be provided here. Given all the uncertainties involved, however, consideration of the essentials can help. In the case of (re)insurance, the focus is on risk-bearing, and thus on the contribution towards a strengthening of resilience. And even if we are confronted with political volatility in the near term, the long-term goal of the ESG criteria remains intact (e.g. sustainability and climate targets). The current shifts in the political assessment of weapons of war and nuclear power clearly show us just how fluid this issue remains.

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## Publications of the Cologne Research Centre for Reinsurance

As of: August 2022

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