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Annual Report 2019 of the Cologne Research Centre for Reinsurance

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Foreword

The reinsurance market continues to face major challenges – at this point we would like to outline just one of these, by way of example.

The renewal of reinsurance contracts effective 1st January 2020 seems to present another disappointment for the reinsurance sector. This development is surprising for a substantial hardening of prices and conditions, not only in the retrocession area but also in the primary (corporate) insurance market.

As a rule, a price increase in the retrocession sector is initially followed by a price rise in the reinsurance industry, which then ultimately also occurs in the primary (corporate) insurance market. Yet the trend we are currently witnessing seems to have skipped over the reinsurers. This confronts the reinsurance market with the question of whether – and, if so, when – the price adjustments will also take effect in the case of reinsurance contracts.

The Cologne Research Centre for Reinsurance analyses the latest developments in the reinsurance market and, where appropriate, monitors these through research projects. In the process, the Cologne Research Centre for Reinsurance links its research activities with practices in the reinsurance sector. Hereby, and facilitated through organisation of the annual Cologne Reinsurance Symposium and the Annual Meeting of the Sponsoring Group Reinsurance [Förderkreis Rückversicherung], a bi-directional transfer of knowledge between theory and practice is pursued.

The content of these two scientific events, as well as the completed research projects, are incorporated into scholarship and instruction at the Institute of Insurance Studies, rounding out practice-oriented training in the field of reinsurance.

There are seven researchers, two employees responsible for research management and one administrative employee currently on the staff of the Cologne Research Centre for Reinsurance. Thereby, all material and personnel costs are fully financed by third-party funds provided by the Sponsoring Group Reinsurance.

Within the scope of its social and environmental responsibility, this year the Cologne Research Centre for Reinsurance dealt with the topics of climate protection, sustainability and equality. Because these topics are at once global, national and individual missions, the Cologne Research Centre for Reinsurance developed ideas and took measures to actively practice climate protection, sustainability and equality. In this effort, great importance was attached to maintaining the level of quality while at the same time pursuing the objectives the Research Centre had set for itself in the above-mentioned areas. While it is still in its beginnings, our initiative in the field of climate protection and sustainability is manifested particularly in the most sustainable management of resources and travel we can achieve.

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

Cologne, December 2019

Prof. Stefan Materne, FCII
Chair for Reinsurance
Director of the Cologne Research Centre for Reinsurance

Cologne Research Centre for Reinsurance

In this annual report, the Cologne Research Centre for Reinsurance documents its scientific research projects in detail, as a way of providing friends and supporters with a report on the research work carried out by the Research Centre.

The Cologne Research Centre for Reinsurance was founded in 2008. Through accreditation, in 2009 it was extended into a formal research focus.

Financing for the Cologne Research Centre for Reinsurance (personnel expenses for all employees, materials, literature, as well as travel expenses, etc.) is provided entirely through third-party funds made available by the Sponsoring Group Reinsurance, which currently comprises 94 participating member companies.



Research projects 2019

Below is a brief listing of the main research topics for the Cologne Research Centre for Reinsurance, together with the employees responsible for them.

- **Dietmann, Manuel:** 'The increasing importance of the risk-management function in insurance companies'



This research project is based on market observation and is the result of further development of the system of risk management at many insurance companies. The key drivers of this development are, on the one hand, the strict regulatory requirements and, on the other, an evolved risk landscape due, inter alia, to the digital transformation in the insurance sector.

The tightening of regulatory requirements places insurance companies under an obligation to integrate the function for risk management into all major decisions of the company. Accordingly, the risk-management function must be taken into account in each material decision taken by a board of directors.

The requirements for risk management applicable to the handling of operational risks have also been extended, in particular with the Minimum Requirements under Supervisory Law on the System of Governance of Insurance Undertakings (MaGo). This implies greater involvement by the risk-management function in dealing with operational risks and exercising monitoring tasks in operational areas such as disaster management or spin-offs. In addition, the change in risk profiles, e.g. through digitalisation, requires a future-proof configuration of the monitoring tasks.

Given the growing importance of the second line of defence, many market stakeholders are involved in the further development of the control functions, and the risk-management function in particular. As the sample presentation with the expansion of the range of tasks shows, in future the risk-management function will play a central role within the organisational structures of insurance companies. On the one hand, this is a regulatory requirement in view of an effective and appropriate system of governance. And on the other hand, it is a necessary prerequisite for adequately mapping changes in a sustainable system of governance.



- **Dirks, Jörg:** 'Unmanned aircraft – Evolution of the market for aviation (re-)insurance'

In his research project, Jörg Dirks investigated the topic of unmanned aircraft (drones), taking into account a possible evolution in the market for aviation (re)insurance. The definition of unmanned aircraft

was explained, and the existing forms of insurance cover in the aviation-reinsurance sector were described. Furthermore, this research project provided a comprehensive overview of the background of the new Drone Regulation of the German Federal Ministry of Transport and Digital Infrastructure (BMVI) and compared it with other international aviation regulations applicable to drones (taking the USA as an example). Finally, the challenges and opportunities for the insurance industry were assessed.

Unmanned aerial vehicles (UAV) are increasingly taking over the airspace. Drones simplify certain operations in private and commercial applications alike.

A 'drone' is an unmanned aerial vehicle. Aviation law distinguishes between unmanned aviation systems and model aircraft. According to Section 1 of the German Aviation Act, unmanned aviation systems are exclusively devices that are used commercially. Model aircraft, on the other hand, are private, i.e. devices used for sport or leisure activities. Unmanned aircraft are aircraft that can be operated autonomously by a computer, or remotely from the ground, without having a crew on board.

The areas of application for drones will continue to grow in future. For primary insurers and reinsurance firms, this growing market presents an opportunity not only to generate additional premium income but also to diversify their own portfolios, particularly in the fields of primary insurance and reinsurance in the aviation sector. Primary insurers and reinsurers also act as users, if drones are used to assess insurance claims, and as providers in the development of special insurance solutions for unmanned aircraft.

According to current estimates, more than USD 90 billion will be spent on drones worldwide over the next decade.

According to a Statista source, the market potential of civilian drones in the transport sector alone will total to around USD 13 billion in 2020.

In future, primary and reinsurance companies will continue to face the interesting question of how drones are assessed by the various aviation authorities all over the world. In Europe, the US and the UK (e.g. through ICAO, EASA, FAA and CAA), there are clear rules in place that govern air traffic for drones and thus also permit clear assignment of drones to the aviation insurance line. In Asian countries (such as Japan or India), on the other hand, because drones are currently not viewed as stand-alone aircraft, they are more likely to be situated in the liability-insurance market than in the market for aviation insurance.

Uniform and clearly worded regulations are thus necessary for the use of drones. In order to tap opportunities for the emerging technology of drones while enhancing airspace safety at the same time, the Federal Ministry of Transport and Digital Infrastructure (BMVI) in Germany has promulgated a new regulation for unmanned aircraft, one that is intended to enhance both general safety and privacy protections. This Drone Regulation governs the use of drones in Germany. Comparable regulations in effect in other countries are in identical in some cases, or even stated in greater detail.



- **Joniec**, Robert: 'How is the reinsurance cycle doing?'

Since 2002, the reinsurance market has been subject to many changes (development of alternative capacity through alternative risk transfer, GFC, technological progress). The assumption is that these events and trends have had an effect on the market, but that the exact (direction of) impact has not yet been proven. To investigate this, a uniquely large and detailed data set of North American reinsurance policies from the period 2002-2018 was evaluated. Based on the empirical analysis, it could be shown that the reinsurance market has changed structurally, in such a way that impact of economic effects has been reversed or eliminated. The results of the mixed regression model confirm previous findings, underscore the role of company-specific effects and asymmetric information, but cannot fully explain the variation in prices.

- **Knocks**, Kai-Olaf: 'The ILS market in 2019 – discouragement or wait-and-see?'



Kai-Olaf Knocks dealt with the development of the ILS market in renewals for 2018 and 2019. The market for ILS has experienced robust growth in recent years, and many market stakeholders/observers have been waiting for a real test of the market. This test then arrived in 2017, in the form of the HIM events that led to \$143 billion in damage. The majority of investors kept capital constant, however, and many even increased it; there were essentially three decisive reasons in this connection. The first reason was the prospect of a hardening of the market. The second reason was that although the losses due to HIM events were very high, they were fundamentally within the expected scope. The third reason was the profitable year 2017 on the stock exchange, i.e. the losses from ILS could be offset with income from other classes of asset.

Many investors were much more cautious for 2019, and the capacity provided by ILS fell slightly. If the years 2017 and 2018 are taken together, they generated the highest NatCat claims expenditures ever recorded for a two-year period at all (\$219 bn). Added to this were further additions to reserves for the 2017 HIM events during 2018. In addition to a downward trend on the stock market, 2018 was also characterised by a high proportion of claims resulting from secondary risks that had not been taken into account in the models.

Professional ILS investors will continue to make capacities available – however, further growth in ILS capacity is likely to depend more on price trends than it has in the past.



- **Koch, Wolfgang:** ‘Information asymmetries between reinsurance brokers and cedents’

This topic addressed the effects of information asymmetries between reinsurance brokers and cedents’ The theoretical emergence and avoidance of information asymmetries were derived using the principal-agent theory and compared with the results of structured expert interviews conducted with reinsurance brokers. This reveals that many of the causes of conflicts of interest and of resulting information asymmetries are a thing of the past. The incentive – conceivable under the brokerage model of remuneration – to place contracts at the highest possible reinsurance premiums can be refuted through resort to the argument of long-term customer relationships in a manageable reinsurance market. Furthermore, cedent participation in the remuneration of the reinsurance broker constitutes a sensible system of incentives against information asymmetries. Beauty contests can be used as a screening method to curtail hidden characteristics. Hidden information and hidden action can be reduced through specifications on the part of the cedent until a basis in trust is established. Soft facts give the reinsurance broker hidden-action leeway vis-à-vis the reinsurer. Portfolio management in which the reinsurance broker seeks to improve his or her business relationship with reinsurers could mean a conflict of interest vis-à-vis the cedent. Agency costs are reduced by the signalling costs of reinsurance brokers (e.g. ‘Chinese walls’).

- **Lassen, Fabian:** ‘Reducing volatility through use of an insurance swap’

An insurer’s earnings planning can be improved by combining two different portfolios of independent insurers. This permits use of a multidimensional diversification effect across the region and risk



class. Various methods are available to make this effect usable. In addition to the establishment of an insurance pool, payment flows can also be exchanged by means of an actuarial swap. If both parties swap actuarial payment flows of comparable probability and amount, the volatility of these payment flows can be reduced. This makes planning potentially more effective. In practice, there are some obstacles. First of all, a suitable partner must be found who possesses a complementary portfolio. Data quality also plays a decisive role where the ability to make a statement about the quality of the swap is concerned. In addition, it is crucial to locate suitable parameters as to how the amount of the swap transaction can be limited. Ultimately, it is advisable to let the actuarial swap continue over several years in order to offset possible losses by one party in the future.



- **Materne**, Stefan: ‘Impacts of the various Brexit scenarios on the reinsurance market’

Prof. Stefan Materne examined the potential impacts of Brexit under the various conceivable scenarios. Considerable attention was given to a no-deal Brexit, which at the beginning of 2019 appeared to be the most likely alternative and would have presented the most drastic consequences. This alternative would have created a large vacuum in legal certainty by eliminating many EU-UK contracts and agreements. This prospect alone prompted several cedents on the European Continent to place elsewhere reinsurance contracts that had existed until that point in time with UK-based reinsurers.

Much attention was also devoted to a lively discussion over how to deal with the loss reserves resulting from previous coverage periods and their settlement following the implementation of Brexit. The question was even raised whether UK reinsurers had the authority to make claims payments to cedents resident in the EU at all.

While the risk of a no-deal Brexit appears to be contained at the moment in light of current political developments, this risk could flare up if the free-trade negotiations should fail following the Brexit expected in January 2020.

In any case, primary insurers and reinsurers on the European Continent seem to be well-prepared for the various implementation scenarios of a Brexit. Lloyd’s also appears to be well-equipped following creation of Lloyd’s Brussels; this risk carrier has the approval of the Belgian supervisory authority as

a Solvency II-compliant primary insurer and reinsurer (even if complete forwarding of the subscribed risks to London would appear to be unconventional).

- **Materne, Stefan:** ‘Possible divergence of renewals in 2019 between the reinsurance and retrocession markets’

In a work entitled ‘Possible divergence of renewals in 2019 between the reinsurance and retrocession markets’, Prof. Materne examined the development of the retrocession and retrocession markets since the HIM claims in Q3 2017.

While renewal of the reinsurance contracts as at 1st January 2019 was largely ‘risk-adjusted flat’, renewal of the retrocession contracts was decidedly late. A substantial hardening of prices and conditions occurred, driven in particular by the risk transfer via ILS. Reinsurers, insofar as they depend on the resource of retrocession capacity, were thus placed in an even more difficult position of increasing the price of retrocession, yet these additional costs could not be passed on to the cedents under their active reinsurance contracts.

This study will continue in 2020.

- **Pütz, Fabian:** ‘Transferring cat risks from emerging markets from a macroeconomic perspective’



In 2019 Fabian Pütz investigated ‘Possibilities of transferring natural disaster risks of emerging markets through cat bonds’. To this end, first he examined the economic impact of natural disaster events (in particular on sovereign debt and the economic growth of the state concerned). Building on this, he then presented possibilities for risk transfer in the form of reinsurance. He concluded that, due to societal and social trends that often lag behind economic progress, emerging markets are particularly exposed to the impacts of natural disasters. This is mainly down to an increasing concentration of still-unprotected capital values, such that natural disasters can cause comparatively high direct damage in terms of economic performance (GDP). Due to continued low per-capita income amongst large sections of the population, low insurance penetration and limited fiscal room for manoeuvre on the part of the state, natural disasters in these countries thus tend to have a negative impact on economic growth despite an increase in sovereign debt. By quickly providing liquidity in order to enable the most timely reconstruction possible of capital that has been destroyed, cat bonds have proven to be a suitable instrument for hedging these risks. This can mitigate adverse effects on economic growth and through ex-ante financing of costs can prevent a rapid increase in sovereign debt following a disaster.



- **Wang, Lihong: 'China InsurTech Development'**

Lihong Wang conducted research into the Chinese InsurTech Development. Both insurance and technology have high relevance in China, as technology has become an important part of people's lives. With more than 1 billion smartphones and tablets and an overall active online citizenry, and with rising income and societal changes, people are keen to use insurance to manage their finances. The questions explored are: Why and how do insurers and high-tech firms use technology to generate value for clients in the lifecycle of insurance, and in the meantime, how do Chinese insurers use technology to optimise their operations? The key findings are as follows:

Firstly, FinTech (i.e. online payment systems such as WeChat Pay and Alipay) is an accelerator for InsurTech innovations; this is especially true for the growing middle-class population. Secondly, insurers have various strategies and phases for employing technology in their operations. To illustrate this, Lihong Wang drew a table comparing a traditional insurer and a start-up insurer. Finally, yet importantly, there are numerous implications, opportunities and challenges for the insurance and reinsurance industry.

The planned publications on the individual research themes, as well as the research projects planned for 2020, are listed beginning on page 40.

About us

Bidirectional knowledge transfer and networking

The networking of the Cologne Research Centre for Reinsurance with practitioners and the bidirectional transfer of knowledge is exemplified below on the basis of research into measures in risk policy to reduce the volatility of local natural hazards.

In 2016, Mr Markus Eich, Gothaer, approached Prof. Materne with a topic proposal for a Master's thesis. This proposal was taken up by then-Master's student and research assistant, Mr Fabian Lassen, and carried out under the supervision of Mr Eich and Prof. Materne. Mr Lassen presented the results of his research at the Eurapco (European Alliance Partners Company) meeting in Berne, Switzerland, on 10th October 2017. Thereafter, the actuarial department at Gothaer began work to optimise the concept that had been developed. At roughly the same time, at the annual meeting of the Sponsoring Group Reinsurance, Mr Eich discussed the results of Mr Lassen's Master's thesis with Mr Robert Joniec, a member of academic staff at the Cologne Research Centre for Reinsurance and a member of the Strategic Advisory EMEA Team at Guy Carpenter. This is how the concept developed at the Cologne Research Centre for Reinsurance gained currency amongst practitioners.

In addition, a detailed concept study was published in our series, Publikationen der Kölner Forschungsstelle Rückversicherung [Publications of the Cologne Research Centre for Reinsurance], as was a detailed article entitled 'Tausche Risiko, biete Entlastung - Wie die Senkung der Volatilität durch den Einsatz eines versicherungstechnischen Swaps gelingt' ['Trading relief for risk – How to successfully reduce volatility through use of an actuarial swap'], which appeared in *Versicherungswirtschaft*. All other publications of the Cologne Research Centre for Reinsurance are listed in the Bibliography which begins at page 46.

11-year anniversary of the Cologne Research Centre for Reinsurance

The 11th anniversary of the Research Focus on Reinsurance was marked with a function held on 31st August 2019.

In his remarks, Prof. Stefan Materne offered a retrospective and an outlook on the development of the Research Focus on Reinsurance. The results of this year's research were presented on posters, and the future strategic orientation of the Research Focus was discussed.

Staff news

Since 1st October 2019, Mrs Martina Thomas has been working as a non-academic employee in the Cologne Research Centre for Reinsurance. She performs administrative work in support of the organisation of the Research Centre. Mrs Evelyn Hartramph and Mrs Maaike Heuwold are responsible for research management and project management within the Research Centre.



Martina Thomas



Evelyn Hartramph



Maaike Heuwold

The Cologne Research Centre for Reinsurance would like to thank Mr Kai-Olaf Knocks for 10 years of collaboration that have been very successful, constructive and pleasant in equal measure. Mr Knocks is leaving the team; we wish him all the best both professionally and personally and look forward to his continued support in an important detail.

The Cologne Research Centre for Reinsurance congratulates Mr Fabian Pütz on successfully passing his examination as Doctor of Philosophy (PhD) at the University of Limerick. His dissertation was entitled 'The Impact of Connected Automated Vehicles on the Insurance Sector: A Comprehensive Analysis of Legal and Risk Factors'.



Fabian Pütz, PhD



Ingo Wichelhaus

Since late 2016, Ingo Wichelhaus (Senior Director, Mount Street) has been in charge of external peer review of all publications of the Cologne Research Centre for Reinsurance. With his expertise gained from many years in the reinsurance industry, he is a great asset to our team.

Professor Stefan Materne is a member of the Insurance and Reinsurance Stakeholder Group (IRSG) of the European Insurance and Occupational Pensions Authority (EIOPA). He also collaborates with the advisory board of the Hamburg Society for the Promotion of the Insurance Industry (HGFV) and is a member of the Committee of the German Association for Insurance Science (DVfVW).



Prof. Stefan Materne

Professor Stefan Materne is also a Fellow of the Chartered Insurance Institute (FCII) and a member of the International Insurance Society (IIS).

Publications, lectures, interviews and events in 2019

Publications

The Cologne Research Centre for Reinsurance issued the following publications during 2019:

Materne, Stefan (ed.): Jahresbericht 2018 der Kölner Forschungsstelle Rückversicherung [Annual Report 2018 of the Cologne Research Centre for Reinsurance]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 1/2019.

Materne, Stefan (ed.): Annual Report 2018 of the Cologne Research Centre for Reinsurance. Cologne University of Applied Sciences. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 2/2019.

Materne, Stefan (ed.): Proceedings of the Researchers' Corner for the 11th Annual Meeting of the Sponsoring Group Reinsurance. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 3/2019.

Wang, Lihong: Rising Middle Class in China and the impact on insurance and reinsurance, in Versicherungswirtschaft (VW), No 02/2019, pp. 30-32.

Pütz, Fabian: Reinsurance aspects of connected automated vehicles: Motor Insurance, in Versicherungswirtschaft (VW), No 03/2019, pp. 90-96.

Pütz, Fabian: Reinsurance aspects of connected automated vehicles: Product Liability and Product Recall Insurance, in Zeitschrift für Versicherungswesen (ZfV), 05|2019, pp. 153-156.

Pütz, Fabian: Führt das automatisierte Fahren zu einer materiellen Verlagerung von Haftungskosten auf die Herstellerseite? [Does automated driving lead to a material shift of liability costs to the manufacturer?], in Versicherungspraxis (VP), 5/2019, pp. 8-12.

Hartramph, Evelyn: 16. Kölner Rückversicherungs-Symposium, Rückversicherung 2019 – Ausnahmezustand oder neue Normalität? [16th Cologne Reinsurance Symposium, Reinsurance 2019 – Exception or New Normal?], in Versicherungspraxis (VP), 6/2019, pp. 31-33.

Hartramph, Evelyn: Ausnahmezustand oder Neue Normalität in der Rückversicherung? [Exception or New Normal in Reinsurance?], in Zeitschrift für Versicherungswesen (ZfV), 12|2019, pp. 366-367.

Materne, Stefan (ed.): Proceedings des Researchers' Corner zur 12. Jahrestagung des Förderkreises 2019 [Proceedings of the Researchers' Corner for the 12th Annual Meeting of the Sponsoring Group Reinsurance 2019]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 4/2019.

Koch, Wolfgang / **Materne**, Stefan: Informationsasymmetrien zwischen Rückversicherungsmaklern und Zedenten [Information asymmetries between reinsurance brokers and cedents], in Zeitschrift für Versicherungswesen (ZfV) 21|2019, pp. 648-654.

Materne, Stefan (ed.): Proceedings of the Researchers' Corner for the 12th Annual Meeting of the Sponsoring Group Reinsurance 2019. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 5/2019.

Dirks, Jörg: Wandel der Geschäftsbeziehungen – Wird durch die Distributed-Ledger-Technologie die direkte Beziehung zwischen Erst- und Rückversicherungsunternehmen gestärkt? [Transformation in business relationships – Is Distributed Ledger Technology strengthening the direct relationship between primary and reinsurance companies?], in Versicherungspraxis (VP), 11/2019, pp. 17-19.

Quality assurance

To ensure the quality of the publications of the Research Focus on Reinsurance, the suitability of the texts is presented for critical peer review in advance by an independent, external expert (Mr Ingo Wichelhaus), as well as by the other researching, academic staff and Prof. Materne, and, where appropriate, returned to the author for revision. Only then will the text be published.

To ensure the quality of the research activities of the Research Focus on Reinsurance, there is a regular exchange of academic staff on their current research topics.

Lectures

The following lectures were given by members of the Research Centre during the reporting period:

Dietmann, Manuel: The increasing importance of the risk-management function in insurance companies, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Dirks, Jörg: Unmanned aircraft – Evolution of the market for aviation (re)insurance, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Joniec, Robert: How is the reinsurance cycle doing?, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Knocks, Kai-Olaf: The ILS market 2019 – discouragement or wait-and-see?, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Koch, Wolfgang: Information asymmetries between reinsurance brokers and cedents, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Lassen, Fabian: Reducing volatility through use of an insurance swap, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Materne, Stefan: Selected chapters from reinsurance, GVNW (Gesamtverband der versicherungsnehmenden Wirtschaft e.V.) Delegates' Meeting, 3rd April 2019, Bonn

Materne, Stefan: Business models in reinsurance, ZHAW (Zurich University of Applied Sciences), 12th April 2019, Winterthur, Switzerland

Materne, Stefan: Hosting of panel discussion on 'Brexit, cyber, Dorian and interest – Must reinsurance save the world?' at the RE 2019 meeting in Baden-Baden. Panelists: Dr. Karsten Bromann (Managing Partner Solidum Partners AG), Burkhard Keese (Chief Financial Officer (CFO) of Lloyd's), Silke Sehm (Member of the Executive Board – Property & Casualty, Hannover Rück SE), Manfred Seitz (Managing Director, Berkshire Hathaway Insurance Group), 21st October 2019, Baden-Baden

Pütz, Fabian: Transferring cat risks from emerging markets from a macroeconomic perspective, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Wang, Lihong: China InsurTech Development, 12th Annual Meeting of the Sponsoring Group Reinsurance, 5th July 2019, Niederkassel-Uckendorf

Interviews

Members of the Research Focus also conducted the following interviews:

Materne, Stefan: Interview with Ingo Wichelhaus (Mount Street), 12th Annual Meeting of the Sponsoring Group Reinsurance, Niederkassel-Uckendorf, 5th July 2019.

Events

16th Cologne Reinsurance Symposium Reinsurance 2019 – Exception or New Normal?

On 21st May 2019, the 16th Cologne Reinsurance Symposium was held at the Cologne University of Applied Sciences. The symposium was entitled 'Reinsurance 2019 – Exception or New Normal?'. The approx. 550 participants, some from outside of Germany, experienced discussions and interviews with a particular focus on Brexit, the stability of financial markets, the state of the reinsurance market, ILS, M&A activities, cyber and regulations.



(front row at right: Prof. Dr. Stefan Herzig, President of the Cologne University of Applied Sciences)



(Prof. Stefan Materne)

Professor Stefan Materne opened the event with a report on current activities and developments at the Cologne Research Centre for Reinsurance. His remarks particularly touched on current research topics amongst academic staff, which will be presented at the 2019 Annual Meeting of the Sponsoring Group Reinsurance. He also offered a scientific introduction to the various topics for the day's discussions.

In the first interview, **Philipp Krohn** (Frankfurter Allgemeine Zeitung) interviewed British Consul-General **Rafe Courage** about Brexit. The diplomat indicated that, as a representative of the UK Government, he would welcome it if the agreement already negotiated with the EU were to be approved. A 'hard Brexit' would be economically very harmful to all stakeholders and should be avoided in any case. Courage attached great importance to the British outcome of the European elections of 26th May



(from left to right: Philipp Krohn, Rafe Courage)

2019, as the clear positioning of some of the parties makes the elections essentially a second referendum.



(from left to right: Michael Stahel, Dr. Marc Surminski)

Subsequently, **Dr. Marc Surminski** (Zeitschrift für Versicherungswesen) and **Michael Stahel** (Partner, LGT ILS) discussed the mood swing seen amongst ILS investors over the past two years. Whereas the reaction of the ILS market was rather calm after the claims-filled year of 2017, last year investors were exhibiting increasing nervousness. The ILS fund manager attributed this situation particularly to the fact that 2017 was a good year on

the stock exchange, a year in which losses due to HIM claims were tolerable overall. In 2018, on the other hand, the return on other investments was down as well. The ILS, which is regarded as fundamentally non-correlating with other asset classes, were not able to offset the losses and actually increased the losses further. Stahel does not view the ILS market as in jeopardy, however – investors are aware of the risks, and there is already enough additional capital available..



(from left to right: Herbert Fromme, Steve Arora, Dr. Doris Höpke, Axel Flöring, Dr. Christoph Lamby)

The panel discussion was led by **Herbert Fromme** (Süddeutsche Zeitung), who initially asked participants about the current situation in the industry. **Dr. Doris Höpke** (Member of the Board of Management, Munich Re) emphasised the diversity of the reinsurance market. Significant rate increases were recorded in Japan, for instance, while conditions in many other markets tended to remain stable. Overcapacity in the market will remain, Dr. Höpke pointed out, but a continuous cycle no longer exists. To **Dr. Christoph Lamby** (CEO, R+V Re) claims with man-made causes represent

a major factor in the hardening of the market he perceives. He also anticipates further mergers. **Steve Arora** (CEO, Axis Re) sees challenging pricing levels for the sector in the short term. In the long term, however, there will be more and more new risks, and these make him optimistic about the future. In his view, for instance, cyber will emerge as one of the most important sectors. The high risks are still offset by a very low premium volume, however. Lamby – whose firm offers no stand-alone cyber cover – also expects significant price corrections following the first major loss events. For **Axel Flöring** (Managing Director, Guy Carpenter DACH), cyber poses a major challenge – a challenge the industry should not refuse. There are isolated smaller market players offering comparatively high capacities – but the market as a whole is slow and cautious in its approach to this new risk.

The discussion also raised the topic of costs and cost structure. For example, Fromme noted that IT expenditures by German primary insurers and reinsurers have largely held steady in recent years. Höpke replied that it was important here to distinguish between running costs of IT and investments in IT – a clear difference is discernible here.



(from left to right: Burkhard Balz, Prof. Stefan Materne)

In a concluding interview with Professor Materne, **Burkhard Balz** (Member of the Executive Board, Deutsche Bundesbank) addressed the political situation in Europe. Balz stressed that he still hoped the UK would remain in the EU, but that, regardless of the outcome, it was important to maintain the relationship. Another topic Materne discussed with Balz – who was the rapporteur in the European Parliament for Solvency II – involved the equity requirements for banks and insurers. Solvency II is going well, as Balz pointed

out, but the Bundesbank also calls for a review of the risk-free valuation of European government bonds. Balz concluded by making it clear that the stability of the financial markets needs to be continuously monitored and adjusted by supervisory authorities.

The steadily increasing numbers of international participants were provided with simultaneous translation into English again at this year's symposium.

Following the Symposium, participants at the 'get-together' used the opportunity to continue the discussions, renewing existing contacts and initiating new ones.



(Simultaneous interpreting)



(Get-together)

Evelyn Hartrampf, Research Manager of the Cologne Research Centre for Reinsurance at the Cologne University of Applied Sciences

Impressions of the 16th Cologne Reinsurance Symposium



Handing out name tags



Lecture by Prof. Materne



Roll-up banners



Foyer



Information material in the foyer



Auditorium



President of the Cologne University of Applied Sciences and students



Bachelor students in the 4th and 6th semester with a concentration in reinsurance and employees of the Cologne Research Centre for Reinsurance



Get-together

12th Annual Meeting of the Sponsoring Group Reinsurance

The 12th annual meeting of the Sponsoring Group Reinsurance was held on 5th July 2019 at Hotel Clostermanns Hof in Niederkassel-Uckendorf.



Professor Stefan Materne opened this year's annual conference before some 90 participants and announced that the companies in attendance represented around 85 percent of reinsurance premiums worldwide. He also recited a cartel pronouncement that prohibits price fixing, collusion concerning market behaviour, etc.

Prof. Materne then turned to a presentation of the activities of the Cologne Research Centre for Reinsurance and the Chair for Reinsurance. He reported on

- the various excursions in the past and current years to the Reinsurance Meeting in Baden-Baden, to the annual meeting of the German Association for Insurance Science (DVfVW) in Berlin, to MunichRe and consurance in Munich, and to the event presented by Guy Carpenter at the Cologne University of Applied Sciences
- the numerous research projects of the Cologne Research Centre and introduced the employees.

In addition to the interview of Professor Materne by Mr Ingo Wichelhaus, eight poster lectures by researchers from the Cologne Research Centre for Reinsurance were presented again this year as part of the Researchers' Corner. This resulted in three sessions, each with three or two parallel presentations followed by discussions. After Prof. Materne had announced the various lecture topics, participants at the Annual Meeting had an opportunity to select the topic they preferred. (The lecture topics can be found beginning on page 29.)



Robert Joniec



Wolfgang Koch

Robert Joniec (M.Sc., FCII, cand. PhD) and **Wolfgang Koch** (M.Sc., FCII) at the three designated stations.

Prof. Materne thanked the companies involved in the Sponsoring Group Reinsurance for their valuable support, which had made it possible to finance the various events and the scientific work of the Research Centre throughout the year. He made special mention of the financial support of the excursions, without which some students would have been unable to participate. The Sponsoring Group Reinsurance also provided full financing for the employment of staff members and their research. This was followed by the first of the three sessions of the Researchers' Corner,

with presenters **Manuel Dietmann** (M.Sc.), **Robert Joniec** (M.Sc., FCII,



Manuel Dietmann

Following the first session of Researchers' Corner, Prof. Materne thanked Mr **Andreas Hinkel** for his many years of support of the work of the Cologne Research Centre for Reinsurance, and particularly for carrying out audits as well as his activities as Treasurer. It was only fitting for Mr Hinkel to be presented with a Lumibär (bear-shaped light) in recognition of his continuous contribution to the success of the Cologne Research Centre for Reinsurance. This makes Mr Hinkel – following Mr Zernitzky, Mr Müller, Prof. Dr. Metzner and Mr Baumann – the fifth honoree of the Lumibär.

The award presentation was followed by the second session of the Researchers' Corner with presenters

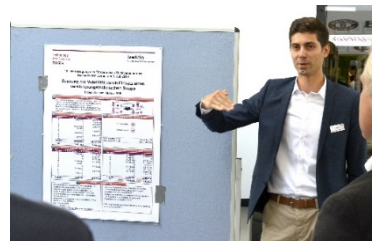
Jörg Dirks (M.Sc., FCII), **Fabian Lassen** (M.Sc., FCII) and **Fabian Pütz** (M.Sc., cand. PhD) at the three designated stations.



Fabian Pütz



Jörg Dirks



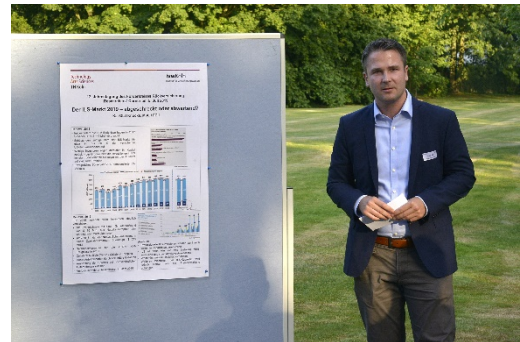
Fabian Lassen



(from left to right): Prof. Stefan Materne and Ingo Wichelhaus

Following this, Prof. Materne conducted an interview with Mr **Ingo Wichelhaus**, Senior Director of Mount Street, on the topic of risk management and portfolio management. Particular attention was devoted to the broad spectrum of risk for financing in the shipping sector.

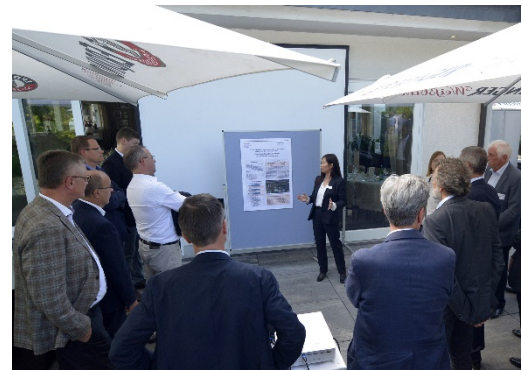
The interview was followed by the third and final session of the Researchers' Corner, with **Kai-Olaf Knocks** (M.A., FCII) and **Lihong Wang** (M.Sc., FCII, cand. PhD), immediately followed by a successful conclusion over dinner and a final digestif.



Kai-Olaf Knocks



Participants in the 12th Annual Meeting



Lihong Wang

Researchers' Corner 2019

Once again, the Researchers' Corner was offered as an additional form of knowledge transfer. Eight of the researching members of the Research Centre presented their current developments, each in a brief lecture followed by a discussion:

Session 1

- a) Manuel Dietmann (M.Sc.)
The increasing importance of the risk-management function in insurance companies
- b) Robert Joniec (M.Sc., FCII, cand. PhD)
How is the reinsurance cycle doing?
- c) Wolfgang Koch (M.Sc., FCII)
Information asymmetries between reinsurance brokers and cedents

Session 2

- a) Jörg Dirks (M.Sc., FCII)
Unmanned aircraft – Evolution of the market for aviation (re-)insurance
- b) Fabian Lassen (M.Sc., FCII)
Reducing volatility through use of an insurance swap
- c) Fabian Pütz (M.Sc., cand. PhD)
Transferring cat risks from emerging markets from a macroeconomic perspective

Session 3

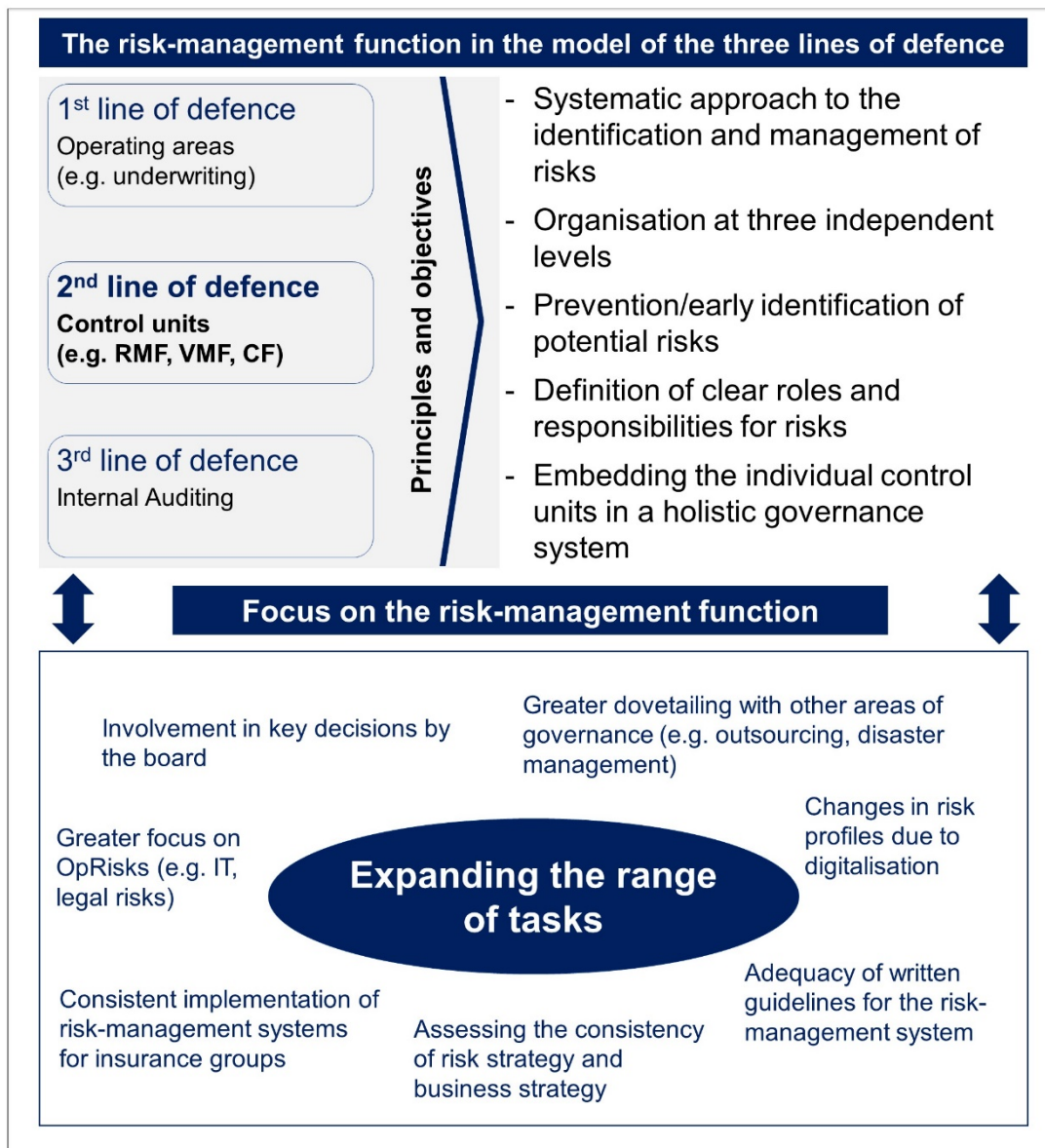
- a) Kai-Olaf Knocks (M.A., FCII)
The ILS market in 2019 – discouragement or wait-and-see?
- b) Lihong Wang (M.Sc., FCII, cand. PhD)
China InsurTech development

Manuel Dietmann: 'The Increasing Importance of the Risk-Management Function in Insurance Companies'
 (cf. also project description p. 7)

**12th Annual Meeting of the Sponsoring Group Reinsurance
 Researchers' Corner, 5th July 2019**

The Increasing Importance of the Risk-Management Function in Insurance Companies

Manuel Dietmann, M.Sc.

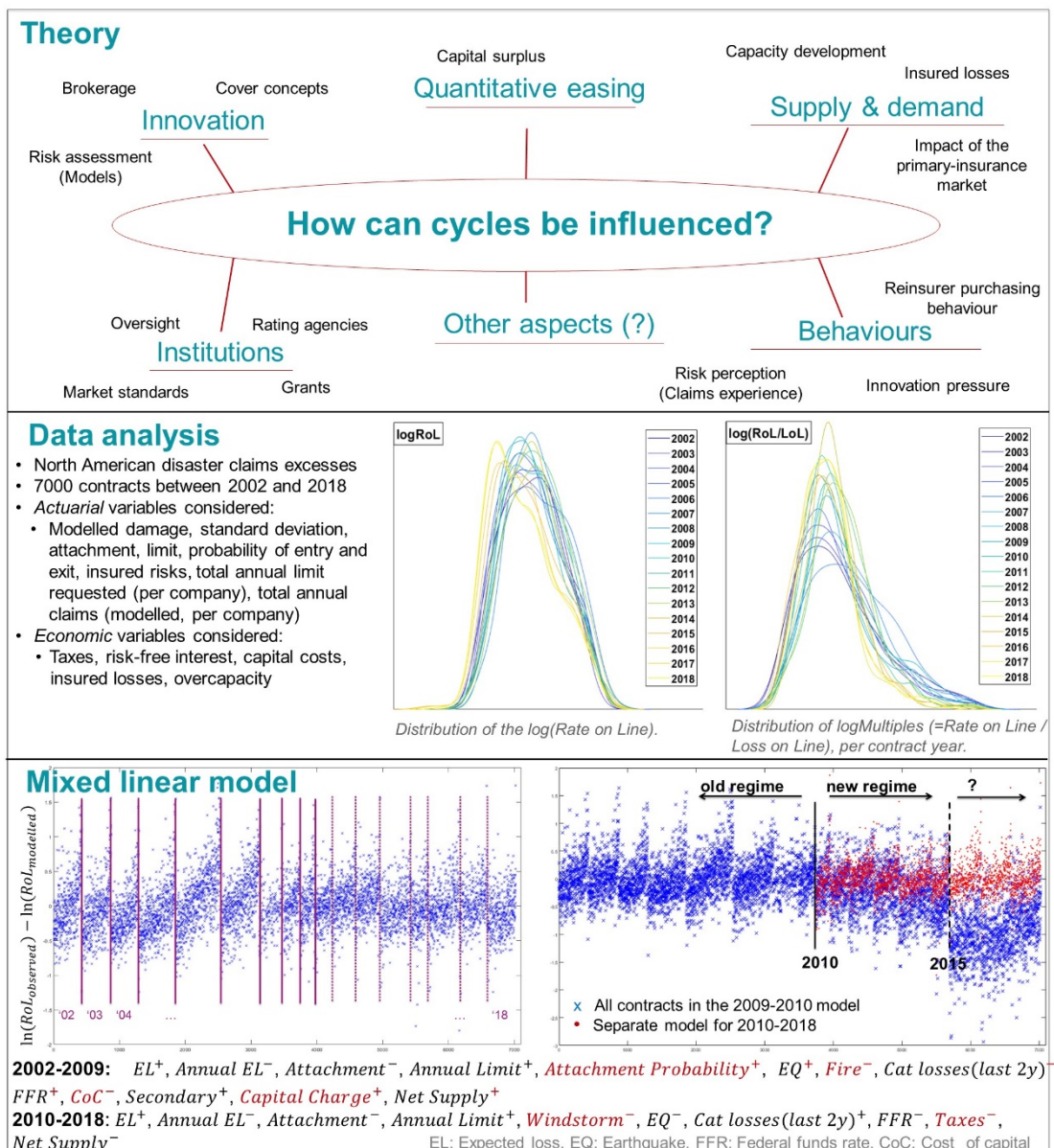


Robert Joniec: 'How is the Reinsurance Cycle Doing?'
(cf. also project description p. 9)

**12th Annual Meeting of the Sponsoring Group Reinsurance
Researchers' Corner, 5th July 2019**

How is the Reinsurance Cycle Doing?

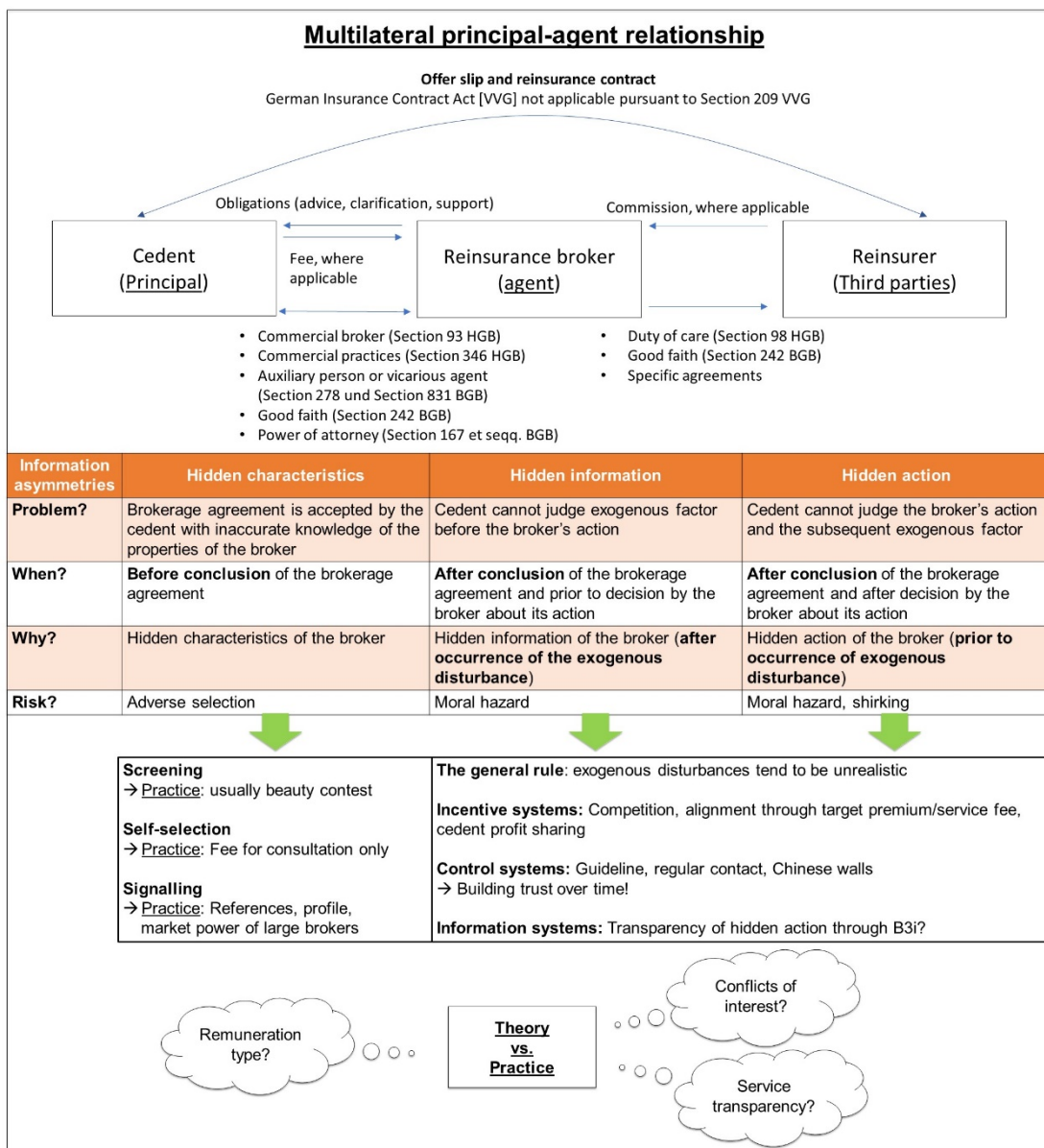
Robert Joniec, M.Sc. / FCII / cand. PhD



**12th Annual Meeting of the Sponsoring Group Reinsurance
Researchers' Corner, 5th July 2019**

**Information Asymmetries between
Reinsurance Brokers and Cedents**

Wolfgang Koch, M.Sc. / FCII



**12th Annual Meeting of the Sponsoring Group Reinsurance
Researchers' Corner, 5th July 2019**

**Unmanned Aircraft – Evolution of the
Market for Aviation (Re-)Insurance**

Jörg Dirks, M.Sc. / FCII

Unmanned aircraft – also known as 'drones' – are aircraft that can be operated autonomously by a computer, or remotely from the ground, without having a crew on board

Terms:

- Unmanned Aerial Vehicle (UAV) / or System (UAS)
- Remotely Piloted Aircraft System (RPA / RPAS)
- Unmanned Combat Air Vehicle (UCAV)

The use is decisive...

- **Model airplanes:**
Use for sports or leisure activities
(Section 1 (2) No 9 German Aviation Act [LuftVG])
- **Unmanned Aerial Vehicles (UAVs):**
Commercial use (e.g. image recordings with the aim of sale/pursuant to Section 1 (2) No 1 LuftVG)

Dynamic growth market in the aviation sector

- 2025: approx. 10% of the global aviation fleet will be unmanned
- Effective regulatory framework conditions required
- International uniform standards for the operation of drones and clear liability rules (e.g. EASA Q2 2019)
- Development of the market for drones and technologies must continue to be monitored

Aviation reinsurance:

- Coverage of comprehensive and liability risks
- No observation for the cover of military drones
- Reinsurance forms np & prop / mandatory & optional
- Clash cover / cumulative across lines (e.g. for UAVs/business interruption/cyber & terror)
- Growing premium volume for commercial UAVs

Behinderungen des Luftverkehrs durch Drohnen nehmen zu
Zahl der gemeldeten Drohnensichtungen im deutschen Luftraum

Jahr	Zahl der gemeldeten Drohnensichtungen
2015	14
2016	64
2017	88
2018*	152

Quelle: DFS Deutsche Flugsicherung. *Stand: 30. November 2018

Kommerzielle Drohnen starten durch
Prognostizierte Entwicklung des weltweiten Marktes für kommerzielle Drohnen

Jahr	Umsatz (in Mrd. US-Dollar)	Absatz (in 1.000 Stk.)
2016	0,6	110
2017	0,8	159
2018	1,1	246
2019	1,6	392
2020	2,4	634
2021	3,6	996
2022	5,3	1.414
2023	7,6	1.909
2024	10,1	2.329
2025	12,6	2.679

Quelle: Tractica

Comparison of regulations / Germany vs. USA

Legal framework in Germany

- Labelling requirement for all drones weighing 0.25 kg or more
- Permission requirement for aeroplane models and drones over 5 kg
- Proof of knowledge from a weight of 2 kg
 - Certificate after examination, minimum age: 16 years
- Prohibition on operating over certain areas
 - out of sight/over 100 metres
 - in controlled airspace
- Insurance obligation (Section 43 LuftVG)

Legal framework in the USA

- Registration requirement for all drones weighing 0.25 kg or more
- Failure to register: fine of up to \$250,000
- Fly only within view and in daylight
- Maximum altitude around 400 ft. (approx. 121.92 metres)
- Minimum age of pilot: 16 years & Remote Pilot Certificate (for commercial use) Designated No Drone Zones
- No obligation to insure

Fabian Lassen: 'Reducing Volatility through Use of an Insurance Swap'
(cf. also project description p. 11)

**12th Annual Meeting of the Sponsoring Group Reinsurance
Researchers' Corner, 5th July 2019**

Reducing Volatility through Use of an Insurance Swap

Fabian Lassen, M.Sc. / FCII

1. Background of the actuarial swap

- A multi-dimensional diversification effect across across the region and the risk class can be achieved and the efficiency of the risk portfolio enhanced.
- Swap of actuarial **payment flows** with comparable expected probability of occurrence and amount

2. Claims expenditure

Period	VU A (flooding)	VU B (hail)
1	-3,137,826	-3,649,671
2	0	-1,349,531
3	0	-2,869,477
4	-13,526,247	-5,115,622
5	-773,421	0
6	0	-4,353,065
7	-2,929,940	0
8	0	-8,064,172
9	-542,372	0
10	0	0
Total	-20,909,806	-25,401,538
SD	3,981,962	2,626,805

3. Correlation & capping of payment flows

Loss amount 26.3%

Loss occurrence -40.8%

VU B relieves VU A	max. 2,475,554
VU A relieves VU B	max. 1,478,585

4. Swap of claims with limitation

Period	B takes over from A	A takes over from B
1	2,475,554	1,478,585
2	0	1,349,531
3	0	1,478,585
4	2,475,554	1,478,585
5	773,421	0
6	0	1,478,585
7	2,475,554	0
8	0	1,478,585
9	542,372	0
10	0	0
Total	8,742,455	8,742,455

5. Claims expense after swap

Period	VU A	VU B
1	-2,140,857	-4,646,640
2	-1,349,531	0
3	-1,478,585	-1,390,892
4	-12,529,278	-6,112,591
5	0	-773,421
6	-1,478,585	-2,874,480
7	-454,386	-2,475,554
8	-1,478,585	-6,585,587
9	0	-542,372
10	0	0
Total	-20,909,806	-25,401,538
SD	3,555,705	2,345,615

6. Summary

- A multi-year maturity seems necessary to achieve the desired effects over the long term
- Adjustments based on claims experience
- In practice, the amount of claims payments due to a natural event is only known after a few weeks
- Relief from the swap presented above would only occur late
- Optimisation through:
 - Estimation
 - Evasion to non-indemnity trigger

- The challenge is to identify hazards that exhibit the same probability of occurrence and a comparable level of expected loss.
- Analysis of correlations between different hazards and regions is necessary required to locate suitable combinations of hazards
- How do the parties involved react to one-sided increases in volatility?

Transferring Cat Risks from Emerging Markets from a Macroeconomic Perspective

Fabian Pütz, M.Sc. / cand. PhD

Characteristics of emerging markets

I. Concentration of unprotected capital values

- ❖ Increasing importance of production capital in the secondary sector
- ❖ Location in exposed regions and lack of structural protection

Consequences:

- **Over-proportional vulnerability** to disaster events
- **Negative impact** on economic growth and sovereign debt

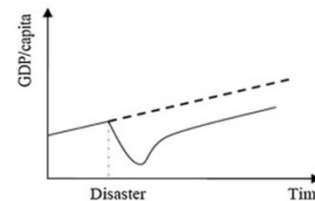
II. Lack of societal-social progress

- ❖ Per-capita income still low, and inequality in distribution of wealth
- ❖ Insufficient access to education, energy and health care

→ **low private-sector coverage of risks**

III. Limited fiscal leeway

- ❖ Short-term reallocation of budgets required
- ❖ Access to refinancing opportunities in the capital market difficult or expensive



Efficient financing of disaster risks

'When risks associated with a public investment are publicly borne, the total cost of risk-bearing is insignificant and, therefore, **the government should ignore uncertainty in evaluating public investments**'

Risk premium of a government investment is passed on to a large number of taxpayers **and tends towards zero**
(Arrow-Lind theorem)



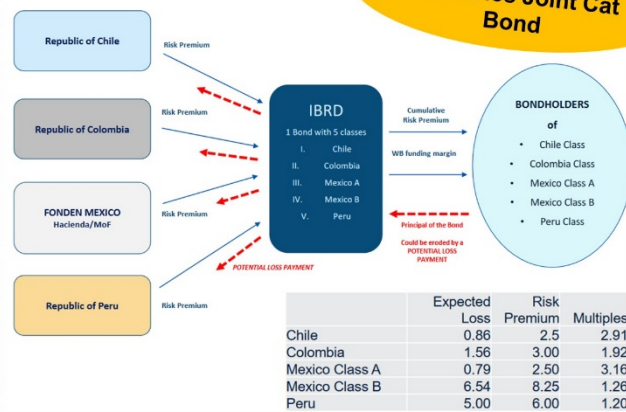
Any form of **ex-ante risk transfer is inefficient** from a risk-neutral perspective, because

Exp. economic premiums > Exp. economic insurance benefits

Benefits of ex-ante financing through cat bonds

- ❖ **Availability of high capacities** necessary for hedging at the state level
- ❖ **Minimising the default risk** through securitisation in collateral
- ❖ **'Simpler' formulation of parametric indices** at state level
- ❖ **Fast and transparent availability of liquidity**

Pacific Alliance Countries Joint Cat Bond



Kai-Olaf Knocks: 'The ILS Market in 2019 – Discouragement or Wait-and-See?'
(cf. also project description p. 9)

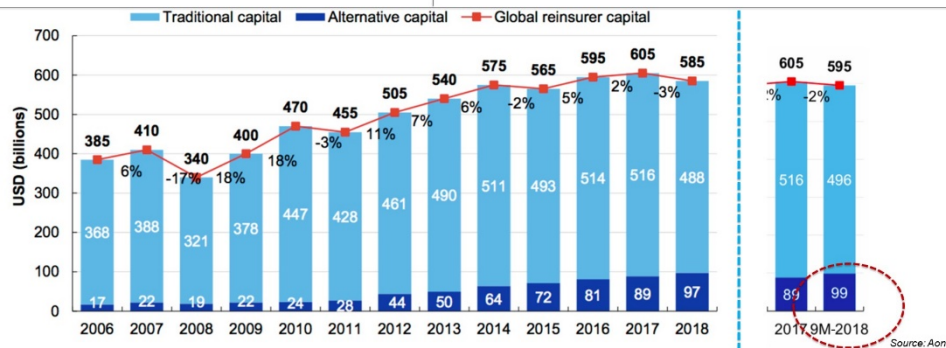
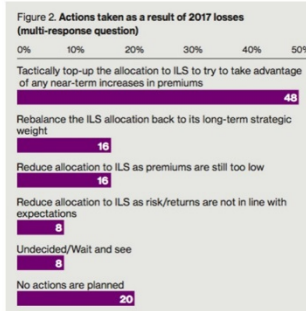
**12th Annual Meeting of the Sponsoring Group Reinsurance
Researchers' Corner, 5th July 2019**

**The ILS Market in 2019 –
Discouragement or Wait-and-See?**

Kai-Olaf Knocks, M.A. / FCII

Renewal 2018

- HIM events in 2017 in particular caused claims of \$ 143 bn
- It is estimated that the ILS market accounted for approximately 25 to 30% of insured US hurricane claims
- Not many investors then withdrew their capital – the majority kept their investments in ILS constant or even increased them in view of prospects of rising premiums
- Profitable stock-exchange year 2017 compensated ILS losses



Renewal 2019

For 2019, many investors acted much more cautiously:

- With \$76 bn in claims expenditures from natural disasters, 2018 marked the fourth-highest value ever recorded
- 2017/2018: highest NatCat claims expenditures ever recorded for a two-year period (\$219 bn)
- Further additions to reserves for 2017 HIM events in 2018
- Collateral multiple clause/collateral trapping
- High share of claims due to secondary risks
- Widening of spreads for high-yield corporate bonds
- Losses in other asset classes in 2018

Abbildung 3
Versicherte Katastrophenschäden,
1970–2018, in USD Milliarden zu
Preisen von 2018



Outlook

- Professional ILS investors are likely to continue to provide capacity
- ILS is still a (nearly) uncorrelated asset class, and that makes it attractive
- Massive liquidity still available
- Further growth in ILS capacity, however, will depend more on price trends

**12th Annual Meeting of the Sponsoring Group Reinsurance
Researchers' Corner, 5th July 2019**

China InsurTech Development

Lihong Wang, M.Sc. / FCII / cand. PhD

Introduction

InsurTech is the ecosystem of focused, innovation-based companies (often startups) that generate value for clients and/or insurance incumbents by disrupting or solving problems across the insurance value chain through the engagement of technology by following a lean and user-centric approach (The InsurTech Book, 2019).

With more than 1 billion smartphones and tablet devices, 900 million users of WeChat and over 750 million internet users, China is embracing and advancing in the InsurTech innovation. Leading insurers and startups are using new technologies to connect with and serve customers.

InsurTech Strategies

Three fundamental InsurTech strategies of the Chinese insurance companies are:

Enable

- To use AI, Cloud Technology, fraud detection & intelligent claims handling to enhance workforce capabilities.

Integrate

- To create an ecosystem in its own value chain and also benefit the social integration.

Commerce

- To sell technology products to other industries and profit from its investment in InsurTech.

The Chinese insurance market has developed at a speedy pace over the last two decades. While technology becomes part of people's everyday life, traditional insurers (incumbents) and start-ups supported by tech-firms (such as Alibaba, Baidu, and Tencent) are engaging to connect directly and to serve their clients more effectively. Critical tools for InsurTech include **big data, cloud computing, artificial intelligence (AI), blockchain, and the Internet of Things (IoT)**.

Case Study

**Ping An Group
(Traditional)**



At the early stage, Ping An digitizes its auto, health, and life insurance business by building online portals that promote digital offering.

Through Ping An's various apps (health care, real estate, loyalty reward program), Ping An is able to reach out to 400 million users.

Collecting customers and consumers data, Ping An is marketing and cross selling its whole range of financial services.

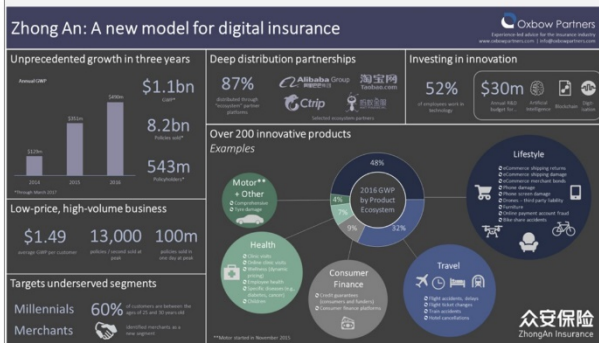
**Zhong An
(Start-up)**



Zhong An is a digital insurer founded by Ant Financial, *Ping An* and Tencent. The insurer uses data & new technologies at every stage of its operation.

From using data to analyse customers' needs & develop products according, to engaging AI and blockchain to settle claims online & reduce fraud.

Through Cloud Computing, the company is able to operate at a relatively low cost. The advantage is a driving force of Zhong An's rapid growth over the last six years.



(Digital) Opportunities and Challenges for Insurers

InsurTech enables Chinese insurers to engage directly with customers, per online and self-service mechanism, similar to the banking and retail sectors. Insurers can collect and analyse customers needs and gain insights that can be using in underwriting and marketing. However, reputational risks, cyber risks, and software flaws can expose insurers to serious consequences in the digital age.

Impressions of the 12th Annual Meeting of the Sponsoring Group Reinsurance



Excursions 2019

As every year, the Sponsoring Group Reinsurance made it possible for academic staff of the Cologne Research Centre for Reinsurance, together with students with a concentration in the field of reinsurance, to make several excursions and participate in a variety of events in the (re)insurance market. These excursions consisted of the following events in 2019:

- Annual Meeting of DVfVW [German Association for Insurance Science], 27th - 28th March 2019 in Berlin.
- 6th Discussion Forum of TransRe on 3rd April 2019 in Munich.
- Excursion to Munich Re and consurance on 2nd May 2019 in Munich.
- Presentation by Guy Carpenter on 27th May 2019 at Cologne University of Applied Sciences.
- Colin Brett Seminar, 4th June 2019 at Cologne University of Applied Sciences.
- Reinsurance Conference 2019 from 20th - 21st October 2019 in Baden-Baden.

Planned research projects and events in 2020

Planned research projects:

Work on and publication of the following research projects are expected in 2020:

- **Dietmann, Manuel:** 'Liquidation and restructuring planning for insurance companies'

Within the scope of the consultation of the European Supervisory Authority on the revision of Solvency II ('Consultation Paper on the Opinion on the 2020 review of Solvency II'), EIOPA assesses the possibility of harmonising existing practices relating to liquidation and restructuring planning for insurance companies. A consistent approach to the basic elements of this planning aims to further increase protections for policyholders. Against this backdrop, Manuel Dietmann examines the integration of liquidation and restructuring planning into the existing process for risk management at insurance companies.

- **Dirks, Jörg:** 'Challenges posed by cyber risks in reinsurance – Insurable on a parametric basis and through AI?'

The complexity of the cyber threat and the evolving nature of the risk involved present a host of challenges for the design of insurance products, for underwriting, for risk management and for cumulative control – for both primary and reinsurance companies. Correct assessment of cyber risk is therefore indispensable, and the right approach must always be developed further.

The complexity of a risk, its assessment and, above all, the lack of data and understanding become decisive factors when considering the enormous cumulative potential of cyber policies. Because connectivity and cyber technology are ubiquitous, a widespread single event can lead to a large number of cyber contracts.

In cyber insurance, the past does not provide a reliable indication of the likelihood of a claim; risks must be simulated with the aid of complex model calculations. Artificial intelligence (AI) could be beneficial for the assessment of cyber risks in the effort to make patterns and probabilities in the field of risk transfer easier and more efficient to analyse. Parametric insurance solutions supplemental to classic insurance could provide an alternative approach. Parametric cyber coverage with a defined trigger can be offered as a trigger for payments of claims.

The research will examine the general insurability of cyber risks. It will also analyse whether parametric cyber cover can prevent transparency problems in the settlement of claims and reduce costly audits by reinsurers. Another aim of the investigation is to determine the extent to which assessments of cyber risks can

be simplified and rendered more efficient with the aid of a possible AI strategy. Parametric cyber solutions can also be interesting for alternative capital; particularly in the NatCat area, vehicles with trigger solutions such as this are in widespread use.

- **Joniec**, Robert: 'Pricing on reinsurance auction platforms'

As a rule, reinsurance contracts are negotiated behind closed doors between an insurer (including its reinsurance broker) and individual reinsurers. But what happens if contracts are standardised to such an extent that they can be auctioned? Parallel to alternative risk transfer, platforms for the auction of reinsurance are evolving, promising reduction in information asymmetries, heightened competition and thus a more efficient market. On the basis of placement records by the GC ReBid platform of reinsurance broker Guy Carpenter, we examine the pricing of some contracts in the context of previously examined market dynamics (research topics in 2018, 2019) along with literature on general auction theory.

- **Koch**, Wolfgang: 'The role of reinsurers in regard to the Pandemic Emergency Financing Facility (PEF)'

Low insurance penetration and low per-capita gross national income render developing countries particularly susceptible to epidemics. In addition, as the case of the Ebola epidemic in 2014 and the late intervention by the World Health Organization demonstrated, gross domestic product has fallen due to decreasing factors of human capital and labour, while sovereign debt has increased.

The limited tools of fiscal policy in the hands of developing countries are expected to improve with the support of the 'Pandemic Emergency Financing Facility' (PEF). The PEF has stated that the rapid pay-out mechanism, which is coupled to parametric triggers, can create resilience in developing countries and cushion exogenous shock. In addition, risk modelling should reveal any needed ex-ante measures. The precise functioning of PEF and the opportunities for the reinsurance market will be examined in the elaboration.

- **Lassen**, Fabian: 'Environmental social governance – New challenges and potentials for the reinsurance industry'

Increasing social pressure and uncertainties around the impact of climate change are leading to increasing interest, on the part of customers, investors and regulatory authorities, in observance of criteria of Environmental Social Governance (ESG) in insurers' and reinsurers' corporate strategies. As risk bearers and investors, these therefore increasingly incorporate ESG criteria into their investment and subscription strategies. Specifically, this means, for example, less investment or insurance for the coal industry – or even none at all. Some insurers publish their approach to this topic and are also increasingly trying to assess and choose their business partners accordingly. In future, insurers

could apply ESG criteria when choosing their reinsurers. Reinsurers then face the difficult balancing act of, on the one hand, meeting the requirements of their customers with an interest in ESG and, on the other hand, continuing to provide coverage to cedents in countries with a high share of conventional energy extraction, and to coal-fired power plants in particular. The elaboration addresses the field of tension between the different stakeholders such as customers, regulatory authorities and the general public and describes the challenges that result.

- **Materne**, Stefan: 'Interactions between reinsurance, retrocession and primary (corporate) insurance markets based on the example of the 2019/2020 renewal (differentiated according to traditional hedging mechanisms and ILS)'

As in the previous two years, the 2019/2020 renewal is uneven. Retrocession markets appear to be picking up strongly (+ 20% for loss-free programmes; significantly higher rates of increase for loss-affected programmes). At the same time, the rates in the market for primary corporate insurance are gathering steam at a substantial pace as well. Renewal conditions and prices for reinsurance, on the other hand, are stagnant, at least in the regions of Europe and Asia (excluding Japan). The constant or even volatile prices in Europe (e.g. NatCat in Germany and France up to approx. -5%) is presumably the result of a loss-free record in recent years. Japan is expected to experience strong price increases upon renewal on 1st April 2020 as a result of the massive negative loss development of typhoon Jebi and typhoons Faxai and Hagibis in 2019.

- **Materne**, Stefan: 'Expedient delimitation of regulatory and economic influence by the supervisory authorities'

The focus of numerous insurance regulators has broadened in recent years. Whereas previously only compliance with the regulatory requirements was monitored and verified, in the recent past the European Insurance and Occupational Pensions Authority EIOPA has also concerned itself with economic aspects of the primary insurance and reinsurance markets (cf. Financial Stability Reports, FSR). At the 2018 Annual Meeting, BaFin issued the surprise announcement that it would examine the price level for reinsurance – and consequently attended the Baden-Baden Reinsurance Conference in October 2019, among other things.

The outcome of this investigation is awaited with great interest, and in particular the measures derived from the findings.

- **Pütz**, Fabian: 'Opportunities and risks of hedging product-recall risks from a reinsurance perspective'

As part of his research activities, in 2020 Fabian Pütz will examine the 'Opportunities and risks of hedging product-recall risks'. The aim of the study is to analyse developments in the number and characteristics of product recalls in the European and American markets and, building upon this analysis, to derive opportunities and risks for the reinsurance industry. Given the increasing number of recalls, the automobile industry in particular serves as an object of investigation in the effort to identify the effects of various drivers of risk (including greater complexity of the vehicle infrastructure, recalls within the framework of the exhaust-emissions affair, etc.) along with the possible need for adjustments in coverage concepts.

- **Wang**, Lihong: 'China's Belt & Road Initiative – Opportunities and Challenges for (Re)insurers'

Lihong Wang plans to undertake a research project for 2020 on the Belt & Road Initiative (BRI) and its financial implications on the global (re) insurance industry. The BRI, originally the One Belt and One Road Initiative, was announced by President Xi of China in late 2013 and hailed as 'the project of the century'. China's ambitious plan for expansion has led to its injecting funds into Asia, Africa and Europe, through land-based trade and infrastructure projects, in addition to ocean-based infrastructure projects, namely the 21st Century Maritime Silk Road. According to estimates by Swiss Re, BRI projects could generate an additional USD 23 billion in commercial insurance premiums by 2030. The BRI is challenging global insurance professionals and changing risk landscapes throughout the world. This research project will shed some light on the initiative and provide insight regarding its impact on underwriting and claims handling.

Planned scientific events

In 2020, the Cologne Research Centre for Reinsurance will again host the 17th Cologne Reinsurance Symposium and the 13th Annual Meeting of the Sponsoring Group Reinsurance.

- **17th Cologne Reinsurance Symposium**

The Cologne Research Centre for Reinsurance will be organising the 17th Cologne Reinsurance Symposium on 26th May 2020 in the auditorium of the Cologne University of Applied Sciences.

- **13th Annual Meeting of the Sponsoring Group Reinsurance**

The 13th Annual Meeting of the Sponsoring Group Reinsurance will be hosted by the Cologne Research Centre for Reinsurance on 26th June 2020.

Sponsoring Group Reinsurance

The Cologne Research Centre for Reinsurance is fully financed by third-party funds provided from the Sponsoring Group Reinsurance, in which there are currently 94 companies involved. These are 62 risk carriers (with an approx. 85% market share worldwide) as well as 32 cedents and reinsurance-oriented service providers.

Sponsoring Group Reinsurance



Current as at: 31 December 2019

The Cologne Research Centre for Reinsurance ensures bidirectional knowledge transfer between theory and practice, in particular to the Sponsoring Group Reinsurance. It accomplishes this, firstly, via broad personal contacts by Prof. Materne and the academic staff; ongoing, bilateral project cooperation and the exchange of views with the respective experts in the field; and secondly, via the two major scientific events held each year.

The Sponsoring Group Reinsurance also financed two Germany scholarships in 2019 for students concentrating on the topic of reinsurance.

Publications of the Cologne Research Centre for Reinsurance

As of February 2020

2020

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