Publikationen der Kölner Forschungsstelle Rückversicherung
Band 2/2019

Annual Report 2018 of the Cologne Research Centre for Reinsurance

Stefan Materne (Hrsg.)

ivwKöln
Institut für Versicherungswesen

Fakultät für Wirtschafts-
und Rechtswissenschaften

Technology
Arts Sciences
TH Köln

Table of Contents

Foreword

The reinsurance market continues to face major challenges – at this point we would like to outline just two of these.

While renewal of the reinsurance contracts as at 1st January 2019 was largely 'risk-adjusted flat', renewal of the retrocession contracts was decidedly late. As at the date when this Annual Report 2018 went to press (2nd January 2019), the final trend is still not yet discernible. However, there are signs of a substantial hardening in prices and conditions in the retrocession area. Reinsurers, which are depend on the resource of retrocession capacity, would then be placed in an even more difficult position of increasing the price of retrocession, yet these additional costs cannot be passed on to the assignors under their active reinsurance contracts.

Not least the German Federal Financial Supervisory Authority [BaFin] is also certain to set its sights on this aspect in its analysis of the prevailing reinsurance price level, which has been announced for 2019. Of particular interest with regard to a potential determination of insufficient market conditions would also be the resulting reaction by BaFin (and the basis on which this would occur).

A decisive factor for a possible strengthening of the retrocession market would be a changed attitude on the part of alternative capital, which in recent years already provided 50-70% of the retrocession capacity – and rising – via ILS funds and other mechanisms. Unlike traditional reinsurers, 'innocent investors' such as pension funds were increasingly nervous as a result of the high number of claims again in 2018 – particularly the California wildfires in Q4 2018 – as well as the drop in the fund share price of numerous ILS funds prior to the renewal at 1st January 2019.

A further substantial burden on the business climate lies in the utter ambiguity with regard to the modalities of Brexit on 29th March 2019. A no-deal Brexit would seem to be a real – and perhaps even a probable – alternative. This would create a large vacuum in legal certainty by eliminating many EU-UK contracts and agreements.

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.

Currently, there are nine researchers and two employees responsible for science management 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.

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 for the research projects and events of the past year.

Cologne, January 2019

Prof. Stefan Materne, FCII
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 92 participating member companies.

Research projects 2018

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: 'Internal review of the governance system in practice'

  A key element of the Minimum Requirements under Supervisory Law on the System of Governance of Insurance Undertakings is the internal audit of the governance system. Accordingly, the board of directors regularly assesses the governance system, with the assessment cycle to be determined in accordance with the risk profile. Regular assessment must be ensured by means of an audit plan or similar instruments. A variety of approaches towards configuring this process can be observed in practice. It has been found that the sources of information that can be used to assess the governance system are already predominantly in place in the company. Accordingly, the focus of an appropriate implementation of this assessment is not so much on generating additional results but rather on the procedural design of the review. The establishment of a function that assumes responsibility for and centrally coordinates the review process has been shown to be an effective measure. The scope of this function includes, among other things, consolidating the existing results of the different divisions in a uniform format and presenting these to the board of directors as a basis for the final assessment.

- **Dirks,** Jörg: 'Distributed Ledger Technology – Change in business relationships between primary insurers and reinsurance companies'

  In his research project, Jörg Dirks dealt with the topic of Distributed Ledger Technology, taking into account the blockchain and a possible application for data transfer in the primary and reinsurance sector. The fundamentals of this technology were analysed, and the potential benefits of Distributed Ledger Technology for the reinsurance industry were reviewed. In addition, the business relationship between primary and reinsurance firms was presented, and the possible impact of data transfer on reinsurance contracts was examined. Distributed Ledger Technology (DLT) is a special form of electronic data processing and data storage. A distributed ledger describes a decentralised database that permits shared write and read permissions to participants in a network. A special feature of DLT is the blockchain as a technical framework. Blockchains are forgery-proof, distributed data structures in which transactions are logged in sequence, traceable, unchangeable and free from a central entity. The research finds that, with the help of a standard definition for blockchain in the insurance industry, it could be possible in future to map a variety of process steps of the value chains across companies. Where the issue

of data protection is concerned, at the national and supranational levels, legal and technical standards are needed to ensure the conformity of DLT with the requirements of data protection. Particularly in the case of significant risks covered by multiple primary insurers and reinsurance companies, blockchain technology can be used to establish an automatic data exchange between the companies, making use of DLT advantageous in principle where there is a high need to coordinate between several independent participants and/ or repeated use of the database is required. Blockchain and smart contracts based on it create a certain guarantee that transactions will be transferred securely, confidentially and efficiently within a blockchain network. At this point in time, one can only speculate as to how quickly and broadly this transformation will lead to a change in market structures in the primary-insurance and reinsurance industry. Current indications, along with the results of research activity, permit an interpretation that certain market inefficiencies can be corrected, from the conclusion of contracts to documentation to payments of premiums and claims.

- **Joniec**, Robert: 'The price of risk transfer'

The price of risk transfer (reinsurance) is dynamic and would appear to be cyclical. This cycle has been studied, demonstrated and, in part, understood in the past. In light of new developments in the market (alternative risk transfer), technological progress (modelling of hazards and claims) and economic dynamics ('quantitative eating'), it is expected that these factors, too, will have an impact on the cycle. These effects are assessed using a Bayesian regression analysis of a large number of reinsurance contracts. Involved here are several hundred excess losses that cover North American disaster risk and were brokered and documented by Guy Carpenter (market-leading reinsurance broker). The time range considered is approx. 2005 through 2018.

- **Knocks**, Kai-Olaf: 'The Drone Regulation and its (possible) impacts'

Kai-Olaf Knocks examined the regulatory changes made as a result of the Drone Regulation and their practical relevance. The main amendments can be seen in introduction of three weight limits. A labelling requirement was introduced for drones with a take-off weight of 250 g upwards. Compulsory registration still does not apply, however, even though this would have been beneficial in many respects, including for purpose of a more effective assessment of risk to the insurance industry. The second weight limit takes effect for a take-off weight of 2 kg – the weight from which proof of knowledge is required. By far the largest share of the drones in use today have a take-off weight of less than 2 kg, however. From a take-off weight of 5 kg, the

third weight limit applies – here, a permit is required of the kind that already applied in the case of drones in private use. The permission requirement has hitherto been in effect for commercially used drones, regardless of their weight; consequently, this can be viewed as relief for drones in non-private use. The regulation has not made any changes where liability and compulsory insurance cover are concerned.

- **Koch**, Wolfgang: 'Risk transfer in emerging and developing countries'

The topic of 'risk transfer in emerging and developing countries', dealt with the question of to whether climate insurance through sovereign cat pools offers adequate financial protection against natural disasters in emerging and developing countries. There are currently three sovereign cat pools worldwide that are concerned with hedging against natural disasters: 'CCRIF' in the Caribbean, 'ARC' in Africa and 'PCRAFI' in the Pacific. The necessary subsidies are initially donated by the development partners (e.g. G7 states, World Health Organization or World Bank), as the affected states do not have the fiscal latitude to collect more taxes, undertake capital allocations or encumber themselves with more debt in the capital market. The development partners are interested in long-term ex-ante measures that permit improved financing through a more effective portfolio while providing developing countries with long-term opportunities to support themselves at least in part through climate insurance. Climate insurance is issued to these countries through the Insurance Facility SPV in exchange for an insurance premium and covers a portion of the risk; the excess portion of the risk is transferred to the capital market (cat bonds) and the reinsurance market (quota share reinsurance). Sovereign cat pools afford diversification of risk across countries with partially different risk profiles; there are parametric index triggers in place to ensure rapid financing in the event of a loss. The parametric index trigger circumscribes moral risk and increases transparency, whereas the basic risk due to this form of trigger is relatively high (but lower than in the case of the purely parametric trigger). In addition, risk pooling reduces the premium for climate insurance, and operating costs are reduced by means of standardised programmes for all countries; capital costs are saved thanks to a diversified portfolio, and information costs are reduced through improved and standardised information. After weighing the advantages and disadvantages, it can be observed that economic shocks can theoretically be cushioned through sovereign cat pools, thus creating resilience in emerging and developing countries; in practice, however, with respect to hurricane 'Irma', the baseline risk becomes apparent due to a low pay-out for the Bahamas and Haiti by the sovereign cat pool CCRIF.

- **Lassen**, Fabian: ‘Pooling of local natural disasters’

A variety of steps in risk policy to reduce the volatility of the net earnings of a primary insurer have been investigated, with the help of which claims ratios and earnings can be planned more effectively. Non-correlated hazards with a similar return period should be exchanged or combined between several parties in order to benefit from a diversification effect here. Promising approaches turned out to be the use of an actuarial swap, along with creation of an insurance pool between two or more European primary insurers. The greatest challenge when designing an insurance pool is the solidarity of pool members amongst themselves. For how long will several independent insurers be willing to accept a solidarity arrangement at the expense of their own profit, while bearing the losses of another pool member for several periods? Given its lower expected costs and greater flexibility the actuarial swap would appear to be better suited to the creation of an insurance pool. The technical swap can be easily adapted from one period to the next in order to prevent undue advantage on the part of a member. The study is based on the documents provided by two European primary insurers, an evaluation of literature in actuarial science on the topic, and other practical examples.

- **Materne**, Stefan: ‘Impact of NatCat Losses in Q3 on the Reinsurance and the Retrocession Market in Particular’.

Prof. Materne explored the effects of loss-intensive events or calendar years – capital events in particular – on subsequent renewals in reinsurance and retrocession markets. Sample data were provided particularly by the Q3 2017, with the events ‘HIM’ (= Harvey, Irma, Maria), two earthquakes in Mexico and the California wildfires.

At the beginning of the 1/1/18 renewal, reinsurers had voiced their forecasts of significant improvement in pricing and conditions. In the case of programmes affected by claims, naturally there were some massive adjustments in rates and conditions to report. Overall, however, the renewal was disappointing for reinsurers: in addition to minor improvements in pricing and conditions (taking a low level as the point of departure) in the NatCat area, on average the movement in all sectors was a lateral, ‘risk-adjusted flat’ movement. Given the low level of investment income, the current state of the market constitution appears to be scarcely sufficient.

Of particular interest, along with these direct effects, was the study of the indirect effects – originating in the retromarket – on reinsurance prices and conditions. The proportion of alternative capital In the retrocession sector is 50-70%; this is considerably higher than in the reinsurance market (where the proportion is approx. 20-25%). How would ‘innocent investors’ – such as pension funds,

for instance – react to the record-claims year of 2017, which witnessed approximately $135 billion in insured losses?

The difficult results for the investments made were exacerbated by the widespread and contractually-prescribed surcharges in the collateral required to cover the loss reserves in ILS transactions (known as ‘trapped collaterals’ or ‘frozen collaterals’). This constellation of high losses plus illiquid collateral deposits that are mandatory and exceed the actually expected requirements prompted hesitant renewal decisions on the part of alternative capital. This was compounded by substantial, HIM-driven subsequent allocations to reserves on the part of individual ILS funds.

Consequently, in November 2017 a certain waiting attitude was seen among those reinsurers whose active reinsurance capacity is a function of the possibilities and conditions of retrocession; this, in turn, had an impact on reinsurance renewal.

At the same point in time, however, ILS funds managed to acquire additional investments for the upcoming 1/1/18 renewal, in which risk-transfer capacity offered was even increased. Accordingly, there was no hardening of the retrocession market, nor were there any indirect effects on the reinsurance market. There was no change in this picture in renewals made in the course of 2018, either.

There were, however, further subsequent additions to reserves for HIM, which, together with the recent California Wildfires in 2018 – owing less to their absolute loss amount of $8-10 billion than to a continuation of the series of losses – led to a certain nervousness on the part of ‘innocent investors’. This was certainly fuelled by the rapid drop in the fund share price of individual ILS funds.

This disquiet on the part of alternative capital stood in contrast with the relaxed attitude of traditional reinsurers, who were satisfied with current levels for rates and conditions and did not announce any efforts to improve these for the upcoming 1/1/19 renewal.

Finally, we note the remarkable accumulation of alternative risk-transfer capacity under the auspices of the Markel primary-insurance and reinsurance group, which now includes Nephila, the largest ILS fund, along with the other major player CATCo.

- **Pütz**, Fabian: ‘Reinsurance aspects of (networked) automated driving’

In 2018, Fabian Pütz investigated ‘reinsurance-relevant aspects of automated driving’. Specifically, he examined the risk-related and legal impacts of growth in the networking and automation of automobiles from the point of view of the reinsurance sector. He comes to the conclusion that, contrary to the widely expected steep decline in the volume of premiums for primary insurance of motor vehicles, reinsurers certainly have potentials arising out of an increasing risk of cumulative and serial loss events (as a result of cyber attacks, for example). It was also possible to simulate demand for reinsurance to cover peak and cumulative exposures in cases of manufacturer product liability and product recalls. An evolving risk exposure also means that pricing approaches must be tailored to assessments of risk. As automation becomes more and more widespread, the effect for motor vehicle insurance is a necessary shift: away from current, driver-centric pricing and towards an assessment of the technical vehicle system. Alongside these risk-related aspects, there are also opportunities for reinsurers to assist car manufacturers in their efforts to integrate insurance-related services on their own service platforms around the ‘networked vehicle’. This creates an opportunity to act as a holistic strategic partners to car manufacturers.

- **Wang**, Lihong: ‘Rising Middle Class in China and Its Impact on Insurance and Reinsurance’

The new emerging middle-class population is a key driving force for the economic growth in China. The rise of this social group creates huge opportunities for growth in the insurance and reinsurance sectors. This research focuses on the characteristics of the Chinese middle class, including who they are, where they locate and how they spend their money, and the impact on their insurance-purchasing behaviours. The findings show that these are young people, well-educated, confident and optimistic about their future income, with a keen interest in investment, health care and pension insurance products. They are familiar with online platforms and smart mobile applications, and they require customised products with fast and transparent services. This is creating huge opportunities for insurers for premium growth. However, the industry has to transform itself and update its IT systems in order to reduce operating costs and improve customer satisfaction. In the meantime, reinsurers have to monitor their exposure and risk accumulation in light of rising costs, significant value increase and concentration in certain cities.

The planned publications on the individual research themes, as well as the research projects planned for 2019, are listed beginning on page 18.

Staff news

Ms Evelyn Hartramph and Ms Maaike Heuwold are responsible for science management and project management within the Research Centre. Ms Schumann-Kemp, our academic staff member for many years, left the Research Centre on 30 June 2018. Her administrative assistant was by Ms Laura Rengard. The Research Centre would like to thank them both for their excellent collaboration.

Evelyn Hartramph

Maaike Heuwold

Prof. Stefan Materne has been appointed a member of the Insurance & Reinsurance Stakeholder Group (IRSG) for an additional two and a half years by the Board of Supervisors of the European Insurance and Occupational Pensions Authority (EIOPA). He also collaborates with the advisory boards of the Hamburg Society for the Promotion of the Insurance Industry (HGFV) and ARIAS Deutschland. He is also a member of the Committee of the German Association for Insurance Science (DVfVW).

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

Furthermore, Prof. Stefan Materne is active as international supervisory and advisory board.

Publications, lectures, interviews and events in 2018

Publications

The Cologne Research Centre for Reinsurance issued the following publications during the period under report:

Böggemann, Jan: Optimierung des Einkaufs von Rückversicherung im Industrieunternehmen [Optimising Reinsurance Purchase in the Industrial Firm], Die VersicherungsPraxis, Fachzeitschrift für die versicherungsnehmende Wirtschaft, Ausgabe 6/2018, ISSN 0170 - 24 4 0.

Materne, Stefan (Hrsg.): Jahresbericht 2017 der Kölner Forschungsstelle Rückversicherung [Annual Report 2017 of the Cologne Research Centre for Reinsurance]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 1/2018.

Materne, Stefan (Hrsg.): Annual Report 2017 of the Cologne Research Centre for Reinsurance. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 2/2018.

Materne, Stefan (Hrsg.): Proceedings of the Researchers' Corner for the 10th Annual Meeting of the Sponsoring Group Reinsurance. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 3/2018.

Schumann-Kemp, Brigitte: Bericht zum 15. Kölner Rückversicherungs-Symposium Rückversicherung 2018 – Retrozession 2018 – nach Harvey, Irma und Maria? [Retrocession 2018 – After Harvey, Irma and Maria?] Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 4/2018.

Materne, Stefan / **Seemayer**, Thomas: Rückversicherung [Reinsurance], in: Halm/Engelbrecht/Krahe (Hrsg.): Handbuch des Fachanwalts Versicherungsrecht, 6. Auflage, Köln

Materne, Stefan (Hrsg.): Proceedings des Researchers' Corner zur 11. Jahrestagung des Förderkreises [Proceedings of the Researchers' Corner for the 11th Annual Meeting of the Sponsoring Group Reinsurance]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 5/2018.

Joniec, Robert: Wetterrisiko – Entwicklung und Standardisierung neuer Deckungskonzepte [Weather Risk – Development and Standardisation of New Cover Concepts], Die VersicherungsPraxis, Fachzeitschrift für die versicherungsnehmende Wirtschaft, Ausgabe 9/2018, ISSN 0170 - 24 4 0

Lassen, Fabian / **Eich /** Markus, **Materne**, Stefan: Tausche Risiko, biete Entlastung - Wie die Senkung der Volatilität durch den Einsatz eines versicherungstechnischen Swaps gelingt [Willing to Trade Risk for Relief – How Use of an Actuarial Swap Reduces Volatility], in Versicherungswirtschaft (VW), Nr. 11/2019, p. 70-73.

Joniec, Robert: Weather Derivative Design in Wine Production: A Preliminary Study for Mediterranean Grapes, 1. November 2018 / Zeitschrift für Versicherungswesen (ZfV) 21|2018, p. 659 -662.

Pütz, Fabian: Was bedeutet das autonome Fahren für Herstellerhaftung und Opferschutz? [Effects of autonomous driving on manufacturer liability and victim protection], in VGA Nachrichten, Jahrgang 67,2018 – Nr. 3, ISSN 0170 – 96660

Pütz, Fabian: Die Auswirkungen automatisierter Fahrzeuge auf das Geschäftsmodell der Kfz-Versicherung: Die Wirkung von Rechts- und Motivationsaspekten auf das Regressverhalten des Kfz-Versicherers [The Impact of Self-Driving Vehicles on the Business Model for Automotive Insurance: How Aspects of Law and Motivation Affect the Recourse Behaviour of the Motor-Vehicle Insurer], 15. November 2018 / Zeitschrift für Versicherungswesen (ZfV) 22|2018, p. 697-700.

Lassen, Fabian / **Eich**, Markus / **Materne**, Stefan: Entwicklung eines länderübergreifenden Versicherungspools und anderer risikopolitischer Maßnahmen zur Reduzierung der Volatilität von lokalen Naturgefahren [Developing a Transnational Insurance Pool and Other Measures of Risk Policy to Reduce the Volatility of Local Natural Hazards]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 6/2018.

Lectures

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

Dietmann, Manuel: Internal review of the governance system in practice, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Dirks, Jörg: DLT – Transformation of business relationships in reinsurance, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Joniec, Robert: Supply and demand shocks in the risk-transfer market, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Knocks, Kai-Olaf: The Drone Regulation and its (possible) impacts, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Koch, Wolfgang: Risk transfer in emerging and developing countries, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Lassen, Fabian: Pooling of local natural disasters, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Materne, Stefan: Harvey, Irma, Maria and the consequences for the reinsurance market, Symposium of the German Bar Association, 'Cyber risks, natural disasters, economic sanctions, etc. – cross-border challenges for insurance sector and industry', 17th February 2018, Obernai near Strasbourg, France

Materne, Stefan: Reinsurance Day at Triglav International Business Academy, 'Introduction to Reinsurance and Changing Business Model of Reinsurance', 6th October 2018, Ljubljana, Slovenia

Materne, Stefan: Hosting of panel discussion on the topic of 'Reinsurance in turbulent times' at the Meeting Re 2018. Panellists: Dr. Frank Grund (Chief Executive Director of Insurance and Pension Funds Supervision, German Federal Financial Supervisory Authority [BaFin]), Dr. Doris Höpke (Member of the Board of Management, Munich Re), Roland Oppermann (CFO SV SparkassenVersicherung), Dr. Michael Pickel (Member of the Executive Board of Hannover Rück SE and E+S Rückversicherung AG), 22nd October 2018, Baden-Baden, Germany

Pütz, Fabian: Reinsurance aspects of (networked) automated driving, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Wang, Lihong: Implications of China's Rising Middle Class for (Re)Insurance, 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018, Niederkassel-Uckendorf, Germany

Interviews

Members of the Research Focus also conducted the following interviews:

Materne, Stefan: Interview with Dr. Falk Niehörster (Climate Risk Innovations) 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018

Materne, Stefan: Interview with Dr. Magnus Kobel (YAS.life) 11th Annual Meeting of the Sponsoring Group Reinsurance, 13th July 2018

Materne, Stefan: Interview with Adrian Ladburry for Insurance Hub Life, Open for Business.

Planned research projects and events in 2019

Planned research projects:

Work on and publication of the following research projects are expected in 2019:

- **Dietmann**, Manuel: 'Further development of structures and processes towards an efficient governance system'

  Manuel Dietmann analyses implementation of the requirements for the governance system in the German insurance market. In recent years in particular, the organisational and operational structure of insurance companies has been characterised by numerous regulatory requirements. The integration of new functions and processes has led to significant changes in existing organisational structures. In future, it will be increasingly important to press ahead with further development of the governance system, with efforts such as combining various processes in the effort to achieve synergy effects. Practical insights demonstrate differences in the interpretation of regulatory requirements in the market, along with potential approaches to an efficient design of the governance system.

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

  Unmanned aircraft offer great potential for the environment and are increasingly conquering the airspace. Drones simplify certain operations in private and commercial applications alike. Amazon is experimenting with package deliveries by drone; the German water-rescue association DLRG uses drones in difficult search and rescue missions; and insurers themselves use drones in some cases to provide initial damage assessments in the wake of natural disasters. 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. 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 German Federal Ministry of Transport and Digital Infrastructure (BMVI) has promulgated a new regulation for unmanned aircraft, one that is intended to enhance both general safety and privacy protections. The aim of this research project is to offer a comprehensive overview of the background of the new Drone Regulations issued by the German Federal Ministry of Transport and Digital Infrastructure, to compare this with other international aviation regulations for drones (e.g. UK & USA) and to identify the challenges and opportunities for the insurance industry. An additional aim is to compare the current premium income for unmanned aircraft in general liability insurance.

- **Joniec**, Robert: ‘Intra-market interaction between alternative risk transfer and traditional reinsurance’

  Given the volume of data to be processed and a longer waiting period pending receipt of the data, the project begun in 2018 will continue into 2019. An additional aspect will be considered in greater detail in 2019: the intra-market interaction between alternative risk transfer and traditional reinsurance. To this end, catastrophe bonds will be added to the existing basis of data. The contracts examined are also expected to be contracts brokered by Guy Carpenter. The research will examine price movements based on previously established influencing factors and particularly the difference in the two subcategories.

- **Knocks**, Kai-Olaf: ‘QRT analysis’

  The insurance sector will publish SFCRs and QRTs for the third time in 2019. This will make it possible – albeit based on a relatively short history – to discern possible developments and trends. The risk profiles of different insurers will also be compared in order to permit conclusions about the impact of the reinsurance structure and to develop possible approaches for optimisation.

- **Koch**, Wolfgang: ‘Effects of information asymmetries between reinsurance brokers and assignors’

  The theoretical emergence and avoidance of information asymmetries are 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, such as kickbacks or interest income, 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, assignor participation in the remuneration of the reinsurance broker constitutes a sensible system of incentives against information asymmetries. Hidden characteristics can be curtailed using beauty contests as a screening method, and hidden information and hidden action can be reduced through specifications by the assignor until a relationship of trust is established. The reinsurance broker has a hidden-action margin vis-à-vis the reinsurer on the basis of soft facts, and portfolio management in which the reinsurance broker seeks to improve his business relationship with the reinsurers could create a conflict of interest with the assignor. Agency costs are reduced by the signalling costs of reinsurance brokers such as ‘Chinese walls’. Residual losses are at least conceivable due to the low control costs of the assignors.

- **Lassen**, Fabian: ‘The impact of the GDPR on modelling of natural hazards in reinsurance’

  Access to ever-larger amounts of data affords reinsurers a better understanding of hazards and an opportunity to use detailed models in risk modelling. Particularly in the case of natural hazards, the use of such modelling has become an important tool in risk-commensurate pricing for a natural-hazard reinsurance programme. The General Data Protection Regulation (GDPR) went into force throughout Europe on 25 May 2018. Depending on how the new measure is interpreted, it prohibits the exchange of information relevant to detailed models such as these. The interpretation of the EU regulation differs in some respects from one country to the next. The effects of the GDPR on modelling practices in reinsurance are investigated and different interpretations considered.

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

  Prof. Stefan Materne examines the potential impacts of Brexit under the various conceivable scenarios. Considerable attention is given to a no-deal Brexit, as this would currently (2 January 2019) appear to be the most likely alternative and would present the most drastic consequences. This alternative would create a large vacuum in legal certainty by eliminating many EU-UK contracts and agreements. This prospect alone has already prompted several assignors on the European Continent not to renew existing reinsurance contracts with UK-based reinsurers. Moreover, this affects not only the contract renewals that are currently pending, but also the loss reserves resulting from earlier coverage periods and their settlement.

  Following the implementation of Brexit – currently planned for 29 March 2019 – the focus of considerations will be on its actual execution and the effects it will have for reinsurance relationships.

  Prof. Stefan Materne will also continue to pursue a project on which he worked in 2018 – in slightly modified form – and entitled ‘Possible divergence of renewals in 2019 between the reinsurance and retrocession markets’. While renewal of the reinsurance contracts as at 1 January 2019 was largely ‘risk-adjusted flat’, renewal of the retrocession contracts has been decidedly late. As at the date when this Annual Report 2018 went to press (2 January 2019), the final trend is still not yet discernible. However, there are signs of a substantial hardening in prices and conditions in the retrocession area. Reinsurers, which are depend on the resource of retrocession capacity, would then be placed in an even more difficult position of increasing the price of retrocession, yet these additional costs cannot be passed on to the assignors under their active reinsurance contracts.

  Not least the German Federal Financial Supervisory Authority [BaFin] is also certain to set its sights on this aspect in its analysis of the prevailing reinsurance

price level, which has been announced for 2019. Of particular interest with regard to a potential determination of insufficient market conditions would also be the resulting reaction by BaFin (and the basis on which this would occur).

- **Pütz**, Fabian: 'Possibilities of transferring natural disaster risks of emerging markets through cat bonds'

  Within the framework of his research activities, in 2019 Fabian Pütz is investigating 'Possibilities of transferring natural disaster risks of emerging markets through cat bonds'. The objective of the study is, first of all, to analyse the macroeconomic characteristics that typically lead to increased vulnerability to natural disasters in emerging markets. Then, building on this, the efficiency and the macroeconomic benefits of using cat bonds to hedge natural disaster risks at the regional or state level will be investigated. Alongside these demand-oriented questions, currently existing reference projects will be analysed, with special consideration of the role of private-public partnerships. This will permit an assessment of the ways in which cat bonds can be enlisted to reduce existing hedging gaps in emerging markets in ways that are efficient and make sense for all stakeholders involved.

- **Wang**, Lihong: 'InsurTech developments in China'

  Lihong Wang will report on the InsurTech developments in China. As the second-largest insurance market in the world (by gross premiums written), China's InsurTech strategies, innovations and adaptations drawing on big data analytics and offering customised products will likely impact the domestic and international risk management, insurance and reinsurance landscapes. Targeting the rapidly growing number of Internet users (over 800 million people in China), many Chinese insurance companies, including traditional insurers, new start-ups and joint ventures, have been exploring the application of new technologies (such as blockchain, Internet of Things and telematics) in the insurance industry. They aim to reduce operating costs and improve customer satisfaction. This research will present the findings in the life and non-life sectors where InsurTech has made an impact for the Chinese market, in the current phase of InsurTech development, as well as obstacles or challenges for the country going forward. The research will also address the potential of InsurTech for growth in China.

Planned scientific events

In 2019, the Cologne Research Centre for Reinsurance will again host the 16th Cologne Reinsurance Symposium and the 12th Annual Meeting of the Sponsoring Group Reinsurance.

- **16th Cologne Reinsurance Symposium 2019**

  The Cologne Research Centre for Reinsurance is organising the 16th Cologne Reinsurance Symposium on 21st May 2019 in the auditorium of the Cologne University of Applied Sciences.

- **12th Annual Meeting of the Sponsoring Group Reinsurance 2019**

  The 12th Annual Meeting of the Sponsoring Group Reinsurance will be hosted by the Cologne Research Centre for Reinsurance on 5th July 2019.

15th Cologne Reinsurance Symposium

Retrocession 2018 – after Harvey, Irma and Maria?

This year, retrocession – particularly in the wake of damage brought on by natural disasters in 2017 HIM, California wildfires, Mexican earthquakes, etc. – was one of the main topics of the 15th Cologne Reinsurance Symposium hosted by the of the Institute of Insurance (ivw) of the Cologne University of Applied Sciences on 5th June 2018. The approximately 530, in some cases international, participants also experienced three interviews – devoted to the Chinese reinsurance market, the current situation in life (re-)insurance, and the topic of artificial intelligence – and the concluding panel discussion on additional issues of current relevance.

(Prof. Stefan Materne)

At the outset of the event, **Professor Stefan Materne** reported on current events at the Institute of Insurance in Cologne and presented the current topic areas in the reinsurance market. He also briefly addressed the current research topics of the academic staff of the Research Centre for Reinsurance and presented samples of their research findings. Specifically, he presented individual poster contributions to the Researchers' Corner, with nine poster entries in all, for the 10th Annual Meeting of the Sponsoring Group Reinsurance held in July of 2017.

He then introduced the topic of the first panel discussion and explained his own view of the past year's developments in the reinsurance and retrocession market. In the reinsurance market, events led to just a slight increase in prices. The recent renewal proved disappointing as a result of a lack of a thoroughgoing hardening of prices and conditions for reinsurers. The effects were also scarcely noticeable in the ILS market – which, according to estimates, represents around 65% of the retro market. This led Prof. Materne to assume that the reinsurance cycle observed in the past no longer exists.

(from left to right: Dirk Lohmann, Kate Vacher, Dr. Marc Surminski, Dieter Winkel)

In the first panel discussion, **Dr. Marc Surminski** (Zeitschrift für Versicherungswesen) shed light on the retro market's response to the natural disasters that had occurred the previous year in the USA. **Dieter Winkel** (President, Liberty Mutual Reinsurance) explained how professional the ILS market had become. In contrast to 2005 – when there was not sufficient capacity available – capital in the amount of approx. EUR 10 billion was made available again for renewal in 2018. **Dirk Lohmann** (CEO, Secquaero) attributed the investors' response mainly to the fact that Harvey and Irma in particular brought no surprises in terms of damage amounts and instead were events that fell within the framework of expectations. The fact that a large share of the cat bonds was left intact also tended to encourage investors. Lohmann is unsure whether these levels of alternative capital will remain available, however, if natural disasters lead to high liabilities in 2018. **Kate Vacher** (CEO, Aspen Bermuda) confirmed this, adding that, in contrast to the situation following the events of 2005, there had been no change in rating and modelling approaches.

(from left to right: Franz Hahn, Philipp Krohn)

The first interview of the afternoon was conducted by **Philipp Krohn** (Frankfurter Allgemeine Zeitung) with **Franz Hahn** (CEO, Peak Re) and was devoted to the Chinese reinsurance market. Hahn drew participants' attention to the tremendous growth in the Chinese reinsurance market, which had grown eightfold over the previous 10 years. China Re is still dominant in the market, but its market share fell to 30% as a result of the IPO. In addition to the ten local players, there are

also six international reinsurers with operations in the Chinese market. Hahn had explicit words of praise for the cooperation with the supervisory authorities there.

In the second interview, Materne spoke with **Stefan Riedel** (Vice President Insurance Europe, IBM) about the topic of 'Artificial intelligence and Reinsurance'. Riedel described IT as the 'production line' of the insurance sector, thus underscoring its importance for the industry. Rather than speak of 'artificial intelligence', he preferred to speak of the 'augmented intelligence' that permeates our everyday lives today. He attributed the failure rate for large-scale IT projects to what are often very high expectations. It is not always possible to fulfil 100% of stakeholders' wishes; under the Pareto principle, however, it is often sufficient to fulfil 80% of these wishes.

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

Following this interview, Philipp Krohn discussed the situation in life (re)insurance with **Dr. Torsten Utecht** (CFO, Zurich Deutschland). While the demand for life insurance products will always be there, there are still major challenges that lie ahead. The industry is able to deal with the additional interest rate reserve (ZZR) in its current configuration. But the industry is very heterogeneous and he could not rule out that one or the other life insurer faces very considerable challenges. Reinsurance concepts are already known for high liabilities – which are likely to continue until 2021/2022. Their costs are often unattractive, however.

(from left to right: Philipp Krohn, Torsten Utecht)

On the topic of run-off, Utecht still considered the cost of the platforms to be far too high, due to the rather low volumes. In their search for economies of scale, run-off companies have an interest in the continuation of the policies acquired, and this can be expected to benefit customers. It is important for the industry as a whole to make use of the opportunities opened by policy-makers – such as the German Life Insurance Reform Act – and to improve the negative image of life insurance.

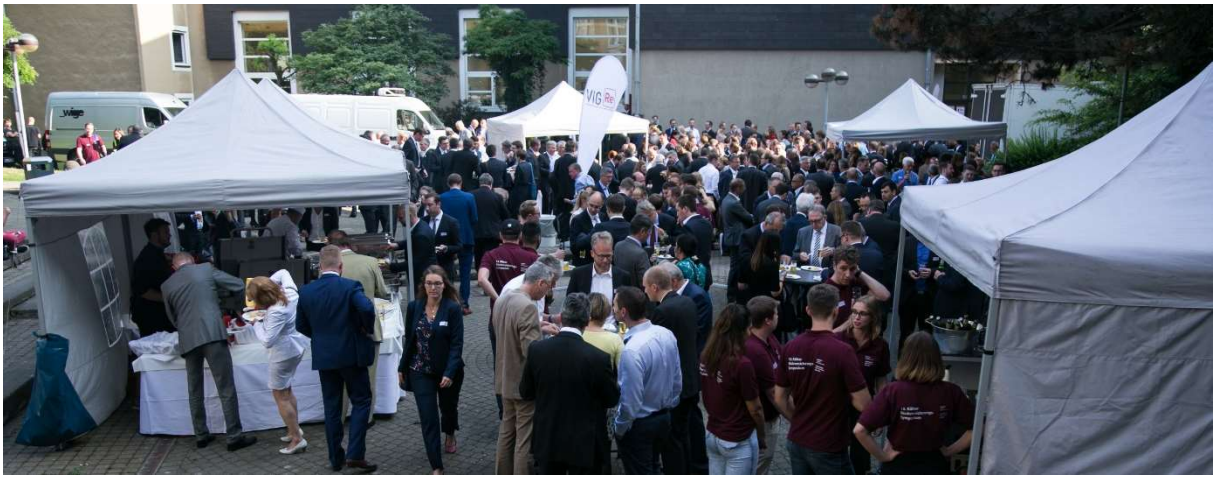
(from left to right: Herbert Fromme, Emanuel Clarke, Jan-Oliver Thofern, Franz Hahn)

The second panel discussion that followed, under the moderation of **Herbert Fromme** (Süddeutsche Zeitung), addressed the sustainability of the (re)insurance business model. **Emmanuel Clarke** (CEO, Partner Re) took an optimistic view of the future. Demand, he pointed out, increased during the recent renewal; there are more and more new risks that are driving business, and he also sees increasing volatility, which favours reinsurance overall. **Jan-Oliver Thofern** (Chairman & CEO, Aon Benfield Deutschland) agreed that risks would not decrease – on the contrary. He viewed the current trend in InsurTech as more of a catalyst for the industry, and not as a threat. **Franz Hahn** (CEO, Peak Re) described his company as a reinsurance start-up, which permits the firm to operate with an expense ratio significantly lower than that of established market participants. He expressed optimism about the growth markets in Asia in particular, as there are many in that region that have not yet been insured.

As the number of international participants in the symposium is increasing, this year non-German-speaking guests had the option of a simultaneous translation of proceedings into English.

(Simultaneous interpreting)

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



(Get-together)

Brigitte Schumann-Kemp, M.Sc., was an academic staff member at the Cologne Research Centre for Reinsurance at the Cologne University of Applied Sciences.

Impressions of the 15th Cologne Reinsurance Symposium

(Handing out name tags)

(Auditorium)

(Information material in the foyer)

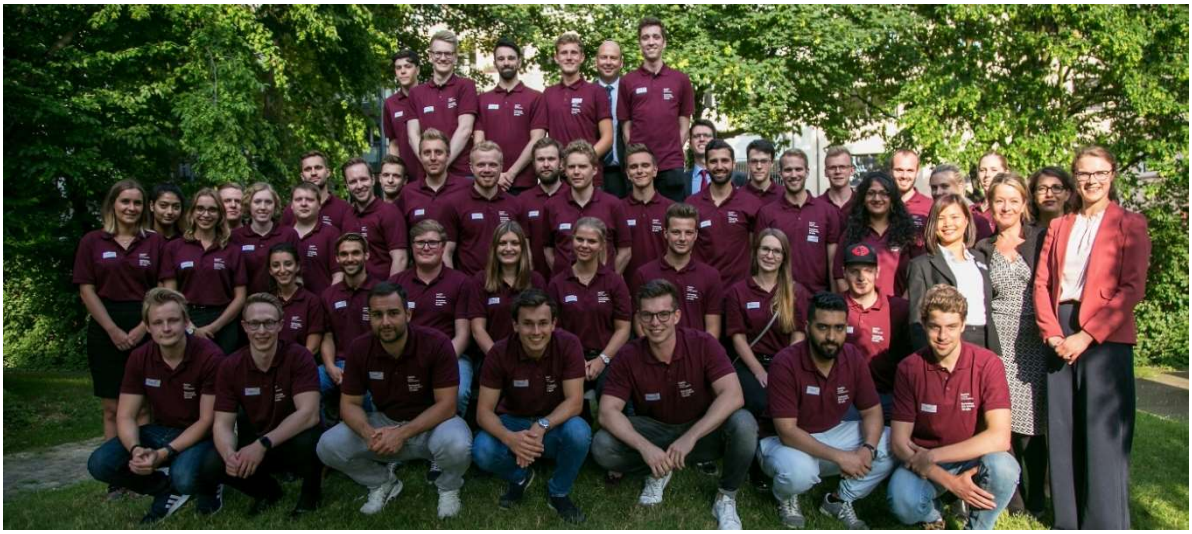
(Handing out microphones)

(Lecture by Prof. Materne)

(Roll-up banners)

(Foyer)

(Get-together)



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

11th Annual Meeting of the Sponsoring Group Reinsurance

The 11th annual meeting of the Sponsoring Group Reinsurance was held on 13th July 2018 at Hotel Clostermanns Hof in Niederkassel- Uckendorf.

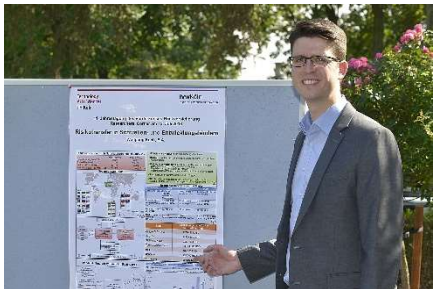
Professor Stefan Materne opened this year's annual conference before some 90 participants and announced that the companies in attendance represented around 85 percent of reinsurance premiums worldwide. He also recited a cartel pronouncement that prohibits price fixing, collusion concerning market behaviour, 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 last year to the Reinsurance Conference in Baden-Baden, and to the annual meeting of the German Association for Insurance Science [DVfVW] in Munich;
- he reported on the numerous research projects of the Cologne Research Centre and introduced the employees.

In addition to the interviews conducted by Prof. Materne with two guests, 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 on page 40)

Jörg Dirks



Wolfgang Koch

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.), **Jörg Dirks** (M.Sc.) and **Wolfgang Koch** (B.Sc.) at the three designated stations.

Manuel Dietmann

Afterwards, Prof. Materne conducted the first interview of the day with **Dr. Magnus Kobel**, founder of Yas.life, who has been dealing with the topic of health for over 20 years. After holding positions in venture capital and corporate development at Allianz Private Krankenversicherung, for many years he worked as a strategic management consultant on issues in health insurance – most recently at Deloitte Consulting. In the course of the interview, Dr. Kobel first explained the business model of his InsurTech before describing his experience with the creation and development of start-ups.

from left to right: Prof. Stefan Materne and Dr. Magnus Kobel

SM: Dr. Kobel, let's begin with the start-up/hipster test. How do things look in your company?

Dr. Kobel: We do meet the hipster rate in our team, so no doubt I'm very atypical; I already miss the mark when it comes to the full beard.

SM: Do you ride a road bike?

Dr. Kobel: You got me! I didn't even know you needed one to be a start-upper. But after all – I don't have a car of my own any more; I only travel around on foot, by bike or with public transport.

SM: And does your start-up have a business address in Berlin-Kreuzberg?

Dr. Kobel: Even better: Berlin Mitte, top floor with a large roof terrace. It won't get any better than that, unfortunately, because we have to get out of there in the summer of 2019.

SM: Can you tie a tie?

Dr. Kobel: Ever since my days as a bank apprentice… But meanwhile I tend to find myself overdressed when it comes to business meetings with insurance companies. So I always go without a tie these days. On occasions when it makes sense to wear one, I get a bit nervous since I'm out of practice. But I've still got it!

SM: And what are your hobbies?

Dr. Kobel: Being an entrepreneur is fun, but it consumes your energies round the clock. But I definitely take the time for regular exercise, and I still prefer football. And a ski trip once a year is a must.

SM: Please briefly describe your company's product.

Dr. Kobel: We develop digital health services for insurance companies and health insurance funds. Our core product is the YAS app, which captures exercise and health-conscious behaviour from fitness trackers, smart watches or health apps and rewards these with points that can be redeemed for rewards. There are a variety of gamification elements, such as challenges (100,000 steps in 10 days) or team competitions, to ensure constant motivation and an active lifestyle. We develop white-label solutions for our B2B partners.

SM: Are there different variants of your product?

Dr. Kobel: I myself am always amazed at how we are developing our core product, which already has over 50,000 users in the B2C version, into very different white-label versions: For private health insurance companies, statutory health insurance funds, occupational health management and, in 2019, for life insurance companies as well. Together with our lead investor, Deutsche Rück, we're developing a disability product that can also be concluded online.

SM: Who exactly are your clients? Can you give us examples of insurance companies and policyholders?

Dr. Kobel: Our reference clients are Versicherungskammer Bayern (a Bavarian public sector insurance company) und mhplus Betriebskrankenkasse, a company health insurance fund. The product for Versicherungskammer Bayern, which can be found as a white-label product under the name of the 'Meine Fitness' app, is initially aimed at the insured of a new assistance tariff; further plans are already in progress.

SM: What added value does your product offer to insurance companies and policyholders?

Dr. Kobel: Our product benefits insurance companies or health insurance funds in two ways.

First off, with our product we create digital touchpoints to the healthy policyholders whose only contact with their insurance is the monthly payment of premiums into their account. Whereas our app creates positive customer experiences and occasionally daily relevance for policyholders. This is strategically important for insurance companies in the battle for the customer interface. After all, let's be honest: almost everyone uses Amazon and Google, but who actively uses an insurance app on their smartphone?!

Secondly, of course, it's about prevention and insurance companies' honest objective to help their customers stay healthy. This is why our app will soon include the areas of mindfulness, nutrition and prevention in addition to the important topic of exercise.

SM: They just also mentioned possible applications in the area of occupational health management. Can you tell us more?

Dr. Kobel: Although our focus is on insurance companies and health insurance funds, an active request from a company has now prompted us to develop a version for occupational health management, too. And this won't be the only company.

SM: So the app is your core product?

Dr. Kobel: We offer our B2B clients a holistic service: beyond maintenance of the app, we also take care of all the other topics, such as challenges, rewards partners, content and customer service. Our clients appreciate this very much, too.

SM: How important is the significance of a brand and your brand name, YAS.life?

Dr. Kobel: With YAS.life, we have a brand that we can expand even further. You can play very nicely with the name: #SayYAS! has already established itself on our team and among our users.

When I founded the company, I didn't realise how many thousand topics there would be to deal with, including the name. After suggestions by experts had all failed mercilessly in surveys of friends and acquaintances, a night shift finally came up with the brand name.

SM: What prompted you to become a start-up entrepreneur?

Dr. Kobel: I always had a desire to shape things. As a management consultant, you can do that up to a point, and I was very happy to do so for many years. But to now be implementing, piece by piece, a concept I once sketched while waiting for a plane is really very motivating – in spite of all the daily challenges.

SM: What was your biggest disappointment in creating the start-up?

Dr. Kobel: I can't really think of any one thing, but resilience is certainly a skill you need. And in general, you mustn't be afraid to fail, but just do it and rely on your ability to find a good solution in every situation.

SM: And what was your biggest positive surprise?

Dr. Kobel: That it's been possible to attract so many professionally and personally great, predominantly young employees for YAS.life, and that, for all the results orientation, such a pleasant team culture has arisen out of the team itself at the same time.

And how helpful our investors are for the company's development. That applies to the numerous business angels and to our lead investor, Deutsche Rück.

SM: Your main investor is Deutsche Rück, a reinsurance company. Why?

Dr. Kobel: With the business model of YAS.life, we see ourselves at the interface between Digital Health and InsurTech. The areas of competence for venture capital investors are not yet very pronounced in either area, and this is particularly true of the InsurTech area. Having Deutsche Rückversicherung as an investor brings us smart money thanks to its areas of competence, and that's a real competitive edge.

SM: Was Berlin the right location from which to launch your start-up?

Dr. Kobel: Yes and no: The start-up ecosystem in Berlin is already very good. Experts from all over the world want to come to Berlin, and our team is very international. But the *war of talent* has also fully arrived for us, and potential employees' expectations are getting higher and higher. HR skills quickly take on strategic importance, even for a tiny start-up, if you want to maintain the team as a success factor. We are thinking about possibly setting up a second location within Europe as the next step in our growth.

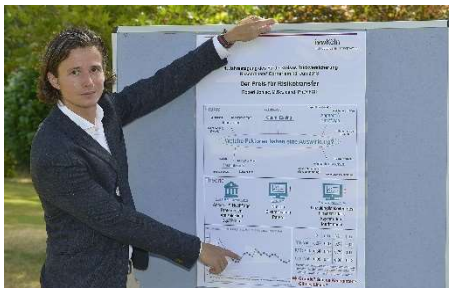
SM: What timeframe do you have in mind for the sale of the company?

Dr. Kobel: Lots of investors have placed their trust in us, but after a certain period they also want to see an exit option along with attractive value growth at the same time. That's something we intend to do, and of course we will, too. But I'm convinced that we are just getting started, and we can still improve on lots of attractive potentials with YAS.life. That's what I'm devoting myself to personally at the moment.

Kai-Olaf Knocks

Fabian Pütz

The interview was followed by the second session of the Researchers' Corner, with presenters **Robert Joniec** (M.Sc., cand. PhD, FCII), **Kai-Olaf Knocks** (M.A., FCII) and **Fabian Pütz** (M.Sc., cand. PhD) at the three designated stations.



Robert Joniec

Within the scope of the interview that followed with Prof. Materne, **Dr. Falk Niehörster,** a leading expert for climate risk, disaster modelling und risk management, explained his research and consulting work in the field of maritime climate change. After graduating with a Mathematics Diploma in System Theory and Quantum Computing, Dr. Niehörster studied climate science and meteorology in Berlin and received his doctorate on the topic of uncertainty analysis of climate models. He then worked at a variety of institutes including the University of Oxford, UK MetOffice and UWA Perth. From 2008 until 2011, he worked in the area of climate topics at the London School of Economics in the post-doc position funded by Munich Re, where his work centred around climate change, topics in reinsurance and political consulting. In 2008, he served as Head of the Risk Prediction Initiative in the Bermudas, then worked as Developer and Director Product Management for Next-Generation Nat-Cat Models at Risk Management Solutions (RMS) in London. Since the foundation of Climate Risk Innovations in 2016, Dr. Niehörster has provided advice to reinsurers on the topic of ocean and climate risks and is also driving business development in this area.

SM: Dr. Niehörster, you have a very impressive and international CV. Would you briefly tell us what you brought you to the Bermudas and how long you lived there?

Dr. Niehörster: In 2008, I was offered the opportunity to run the research funding programme for around 15 reinsurers in the Bermudas. In that position, I was in charge of organising meetings on relevant topics around Nat-Cat risk, developing components and interpreting risk models, and assisting with funding programmes for relevant applied research projects and young scientists. The sponsors were participants of the Bermuda Reinsurance Hub, where I met lots of people and was appointed an expert for the Geneva Association. In the end, I lived on Bermuda for almost three years and still have close ties to Bermuda today.

SM: And why didn't you stay in Bermuda?

Dr. Niehörster: Three years of island life were enough for me. Bermuda has not only beautiful sides but also certain limitations. It's quite a small island. I also had a very tempting offer from RMS in London.

SM: What are your hobbies?

Dr. Niehörster: Triathlon and sailing. I had better conditions for both in Bermuda than I do here. But I'm also interested in literature, film and philosophy.

SM: Why philosophy?

Dr. Niehörster: I came into contact with it quite early in my studies and have always viewed mathematics and physics from the perspective of knowledge theory.

SM: How did you originally come into contact with reinsurance?

Dr. Niehörster: My first contact with the reinsurance industry came from my Munich Re post-doc position at the London School of Economics. For joint projects, I regularly met and discussed research questions with colleagues from Munich. Because I tended to get frustrated with the political consulting on climate change at the time, I turned to the issues arising out of the risks involved in climate change and quickly got to know and appreciate reinsurance as a fascinating industry.

SM: Your most recent project within the framework of climate risk innovations relates to the marine climate. How would you describe climate change in relation to the ocean?

Dr. Niehörster: It's pretty dramatic. The change is significant at different levels: changes in ocean currents, warming across all vertical layers, but there are at times rapid changes at the chemical and marine-biological level, too. Some of these changes are taking place at a breath-taking pace and already have considerable effects.

Stopping this development, would require a rapid shift away from CO_2 emissions. But that's not how things look at the moment, at least not in the form and to the extent actually required.

The largely negative impacts of changes in the ocean are already noticeable and are at times dramatic, such as the irreversible loss of large segments of the Great Barrier Reef. But there are other disasters occurring in the ocean ecosystem that are getting fewer headlines yet entail considerable risks for humanity.

SM: Could you please describe 2 significant risks or hazards (in terms of their impact) that stem from changes in oceans and the marine climate?

Dr. Niehörster: Changes in the oceans have a significant impact on the distribution and intensity of extreme events such as typhoons or hurricanes. These are not only becoming more extreme, but also have a considerably higher potential for damage due to the rise in sea level and the loss of coral reefs or marshland (local and regional in some cases, but global as well).

from left to right: Prof. Stefan Materne and Dr. Falk

A second example is the area of the so-called blue economy, i.e. the industry that uses ocean resources in a broader sense. There is considerable risk potential here due to changes in the ocean. In terms of gross value added, the global blue economy would already be the 7th largest economy when compared to individual countries. According to forecasts by organisations such as the OECD, however, the blue economy will experience significant rates of growth in the years ahead. At the same time, the oceans are changing very quickly, and along with them the resources and the risk situation faced by the blue economy. It should be noted that because the blue Economy has a fairly low insurance density, there is significant growth potential here for the insurance industry.

SM: In your most recent publication 'Ocean Risk and the Insurance Industry',[1] you consider the way in which changes in the ocean affect the insurance industry. Where else do risks arise in the insurers' portfolios?

Dr. Niehörster: In the area of health, for example. Because bacteria or viruses migrate with the spread of the warm-water zones and penetrate into once-cold regions of the

[1] Available at http://climate-risk-innovations.de/

ocean, where coastal ecosystems do not have the necessary resistance to these pathogens. People can then come into contact with these pathogens either directly or indirectly, or through the food chain. This creates risks of new epidemics with effects for the health or life insurance sector, but also new risks in product liability in the food industry.

The insurance of aquafarming/fish farming is affected as well. Algae blooms, the so-called harmful algal blooms, can lead to large regional losses for fish farmers in coastal regions. For example, a large algal bloom in Chile hit a large share of the fish farms there in early 2016, causing a total loss of approximately $800 million.

In addition to these risks, insurance companies also need to heed to political risks for certain regions in which instabilities and conflicts can occur due to sudden shortages of ocean resources.

Moreover, where climate change and ocean risks are concerned, asset and investment risks certainly also play a role for the insurance industry. For example, sudden shocks in the ocean ecosystem could affect entire regions or economic sectors and result in so-called 'stranded assets'.

But where there are changes and new risks to be found, there are always opportunities for the insurance industry. These, too, must be considered. In developing countries in particular, the insurance industry with its capacity can be a decisive factor in managing unavoidable climate risks. There, in the context of climate talks, topics of resilience and public-private partnerships are on the order of the day.

SM: Here come the keywords that have been found their way into our industry in recent years: Public-private partnership or resilience. At the IIS (International Insurance Society) conference last week in Berlin, for example: 2.5 days of resilience with politicians, the World Bank and non-profit organisations. Do you think the awareness of humanity has been sufficiently sensitised, or are we heading straight into the next catastrophe? And are politicians on the right track, or are the activities confined to good soapbox speeches?

Dr. Niehörster: More limited to soapbox speeches. First off, I think that the reduction in CO_2 emissions agreed in and following the COP *(Conference of the Parties)* negotiations in Paris is far from sufficient to achieve the 2-degree objective. Secondly, this reduction has not yet been achieved. On the contrary – the levels of CO_2 emissions continue to rise. To me, it follows from this that, by the end of this century, we will have to expect global warming of at least 3 degrees or more. At a minimum, a responsible approach to risk management should take this scenario into account as well. Of course, first of all, we have to do everything in our power to ensure a more forceful and clearer renunciation of fossil fuels worldwide. But the risks that the CO_2

already emitted poses have to be addressed at the same time. In addition to adjustment funds, there are also exciting developments in terms of the transfer of climate risk, which was also anchored in the climate negotiations under the German leadership of the G7. In some cases, innovative insurance solutions can also be used in very efficient ways to create resilience and adaptation.

For example, where the economic output of a developing or emerging country depends heavily on healthy and functioning marine ecosystems, insurance solutions could be a way to protect this. Imagine how much revenue might be dependent upon a healthy coral reef: in the tourism and hotel industry, in fisheries, even in research for the pharmaceuticals industry or by virtue of the coastline protection a coral reef creates. This is how a healthy coral reef can play a crucial role in the economic situation of a country and its citizens. If the funding required to restore destroyed coral reefs could now be secured through corresponding insurance payments, this would be crucial to the economic resilience of the country concerned, but also for the global ocean ecosystem. The insurance industry can make a substantial contribution here with existing capacity and expertise while doing something for the image of the industry at the same time. Imagine being able to advertise a coral reef directly on location on the beach, but also in your advertising campaigns in this country, on the basis of its insurance cover. . .

SM: In your CV, you repeatedly emphasise that you are working at the interface between science and 'decision-making'. You make a convincing case for your inspiration in science and your desire to shape the landscape in this field. But what does 'decision support' mean in this context? Would you like to influence the decisions in directions preferred by you, or furnish decision-makers with information relevant for their decisions, or provide them with suitable arguments for use in their statements of position on the particular question?

Dr. Niehörster: This is not a simple question and can certainly be answered differently depending on the context. But for me, 'decision support' means processing the data and, for example, predictions in such a way that a problem presented for decision can be measured at all and thus decided. This also includes, for example, selecting an adequate decision-making procedure – as a function of the quality of the data and models available. Thus, in the case of precisely quantified risk, the mathematical basis for a decision is different from a situation in which I do not know or cannot quantify the risk accurately. Making optimal decisions in the face of risk is a fascinating scientific question for me, and it provided me with the necessary passion in my career to date.

Lihong Wang

This interview was followed by the third and final session of the Researchers' Corner, with **Fabian Lassen** (M.Sc., FCII) and **Lihong Wang** (M.Sc., FCII), immediately followed by a successful conclusion over dinner and a final digestif.

Fabian Lassen

Audience at 11th Annual Meeting

Researchers' Corner 2018

Once again, the Researchers' Corner was offered as an additional form of knowledge transfer. Nine 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.)
   Internal review of the governance system in practice
b) Jörg Dirks (M.Sc., FCII)
   DLT – Transformation of business relationships in reinsurance
c) Wolfgang Koch (B.A.)
   Risk transfer in emerging and developing countries

Session 2

a) Robert Joniec (M.Sc., cand. PhD, FCII)
   Supply and demand shocks in the risk-transfer market
b) Kai-Olaf Knocks (M.A., FCII)
   The Drone Regulation and its (possible) impacts
c) Fabian Pütz (M.Sc., cand. PhD)
   Reinsurance aspects of (networked) automated driving

Session 3

a) Fabian Lassen (M.Sc., FCII)
   Pooling of local natural disasters
b) Lihong Wang (M.Sc., FCII)
   Implications of China's Rising Middle Class for (Re)Insurance

Manuel Dietmann: 'Internal review of the governance system in practice'
(cf. also project description p. 7)

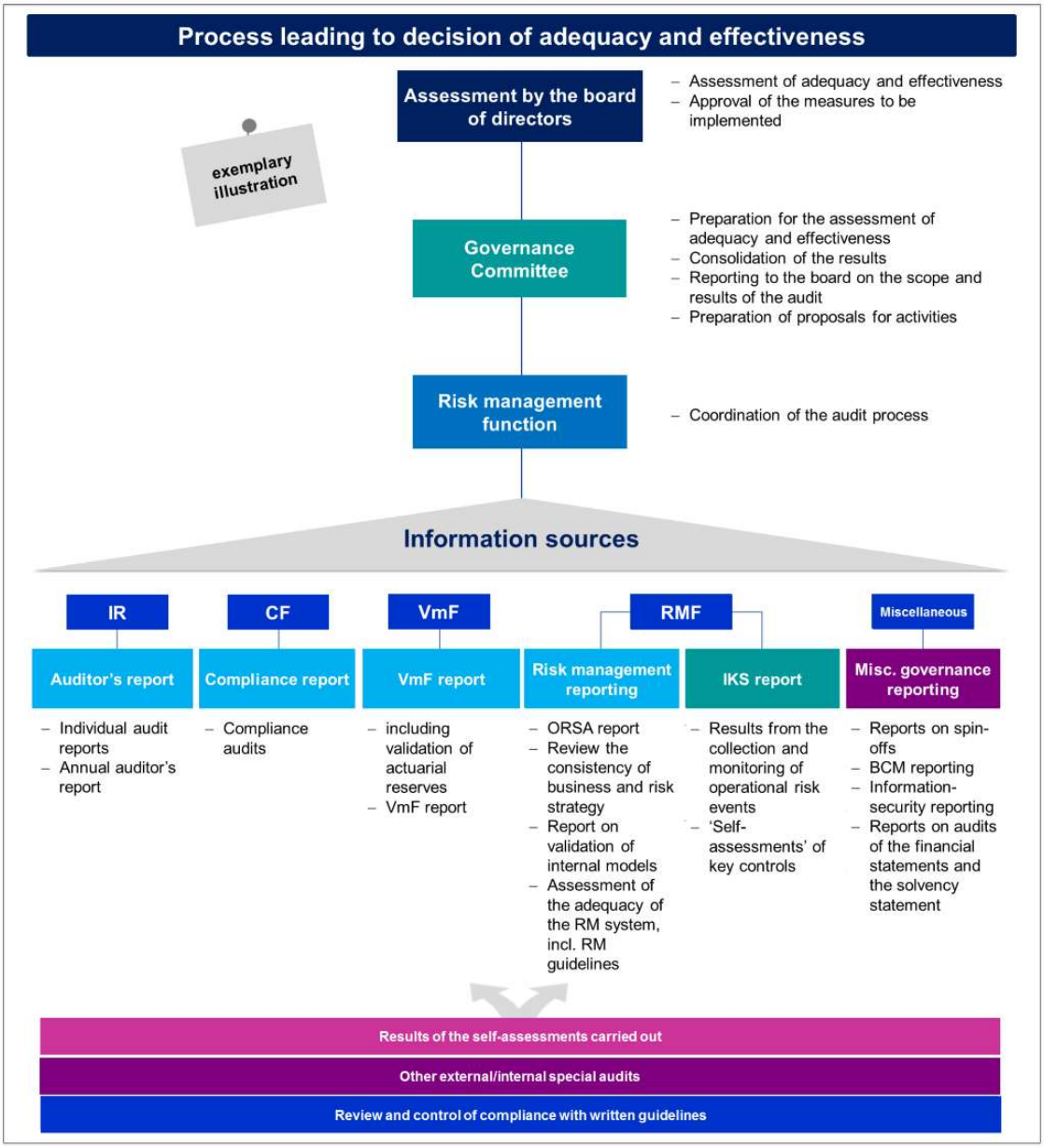
Technology
Arts Sciences
TH Köln

ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers' Corner, 13th July 2018

Internal Review of the Governance System in Practice

Manuel Dietmann, M.Sc.



Jörg Dirks: ‘DLT – Change in business relationships between primary insurers and reinsurance companies’
(cf. also project description p. 7)

Technology
Arts Sciences
TH Köln

ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers’ Corner, 13th July 2018

DLT – Change in Business Relationships between Primary Insurers and Reinsurance Companies

Jörg Dirks, M.Sc. / FCII

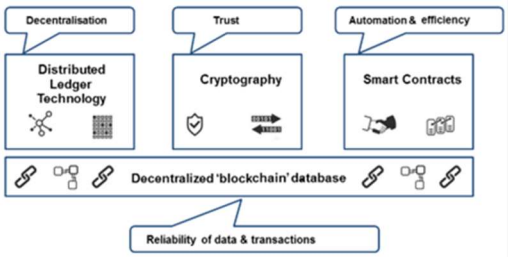
- **Distributed Ledger Technology** (DLT) is the term for a special form of electronic data processing and the data storage in which it results
- Distributed Ledger denotes a **decentralised database**
- Shared write and read permissions for all participants in a network

- Participants can **flexibly** and **independently** add new data records
- Through updating processes, all participants have the **latest version** of the database – transparency is guaranteed

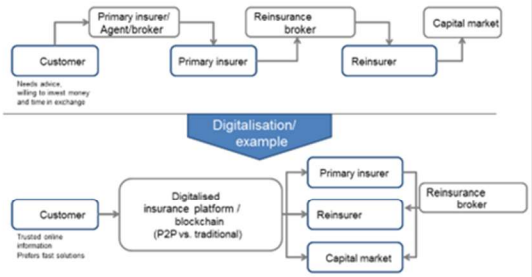
Hype Cycle for Blockchain Business, 2017

- Future definition of a standard for blockchain in the insurance sector
- Mapping of cross-company process steps of the value chains

Blockchain
Fundamentals



Blockchain in primary and reinsurance
Smart Contracts permit P2P platforms



- **Blockchains** are forgery-proof, distributed data structures (decentralised registers)
- Cryptographic technologies are used to map transactions in a **logged**, **verified** and **decentralised manner**
- This is based on **seamless** and **fixed** data recording

- **Smart Contracts** are based on blockchain technology
- Within the framework of DLT, these are **legally binding contracts** (e.g. insurance contracts)

- Easy access to business connections
- Reduces **time and cost** by reducing intermediaries

- Blockchain enables **parametric insurance**
- Blockchain enables **peer-to-peer business models**
- Decentralisation concept can be disruptive
- **Smart contracts** offer enormous automation potential
- Most industry implementations are still in the proof-of-concept/early-adopter phase

Wolfgang Koch: ‘Risk transfer in emerging and developing countries’
(cf. also project description p. 9)

Technology
Arts Sciences
TH Köln

ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers’ Corner, 13th July 2018

Risk Transfer in Emerging and Developing Countries

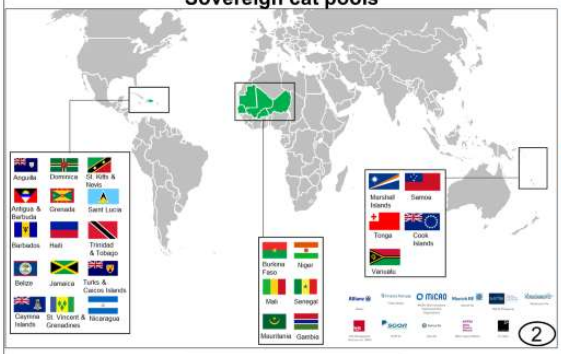
Wolfgang Koch, B.A.

Risk exposure due to natural disasters in 2017

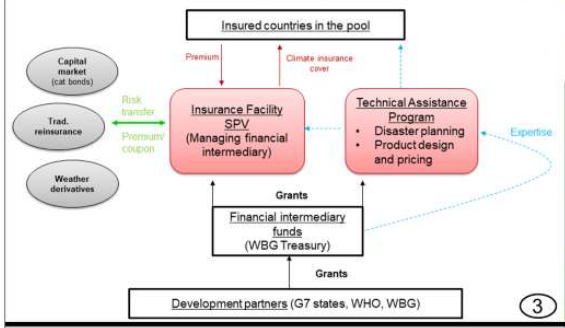
	High Income	Low Income
Loss events: 734	37.8%	6.9%
Deaths: 9,946	10%	15.1%
Loss: USD 337 bn	85.3%	0.6%
Insur. losses: USD 137 bn	96.1%	0%

1

Sovereign cat pools



2



3

In relation to Harvey, Irma and Maria

Scheme	CCRIF	ARC	PCRAFI
Insured risks	Earthquake, tropical cyclone, precipitation	Drought, tropical cyclone, flood	Earthquake, tropical cyclone
Modelling	AIR Worldwide	AIR Worldwide	AIR Worldwide
Premium income 2016	USD 27.7 m	USD 25 m	USD 2.5 m
Cover amount 2016/2017	USD 697 m	USD 100 m	USD 45 m
Reinsured cover (2016/2017)	**25% of the cover amount**	**41% of the cover amount**	**90% (quota should decrease following implementation)**

4

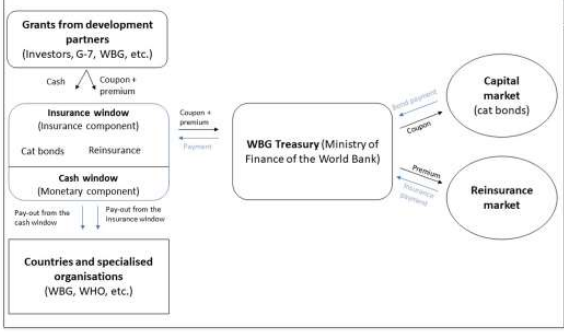
Country	Pay-outs for hurricane ‘Irma’
Antigua & Barbuda	USD 6,794,875
Anguilla	USD 6,529,100
St. Kitts & Nevis	USD 2,294,603
Turks & Caicos Islands	USD 13,631,865
Haiti	USD 162,000
Bahamas	USD 234,000
Total	**USD 29,646,443**

5

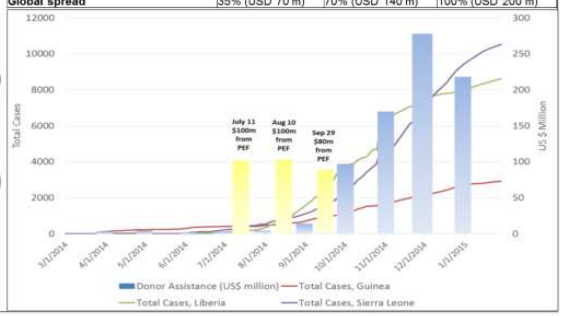
- ✓**Standard network** for concluding insurance contract
- ✓**Risk diversification** across several countries with different risk profiles
- ✓**Risk pooling reduces the premium** for climate insurance
  - Operating costs (e.g. program mme development)
  - Capital costs (diversified portfolio)
  - Information costs (improved, standardised information)
- ✓**Resilience** through parametric index triggers
- ✓**Larger transactions** possible through standard products of interest to the reinsurance market

6

Pandemic Emergency Financing Facility (PEF)



Filoviruses (e.g. Ebola)	Number of dead in IDA countries		
Max. cover: USD 200 m	From 250	From 750	From 2,500
Regional spread	30% (USD 60 m)	60% (USD 120 m)	100% (USD 200 m)
Global spread	35% (USD 70 m)	70% (USD 140 m)	100% (USD 200 m)



Robert Joniec: 'The price of risk transfer'
(cf. also project description p. 8)

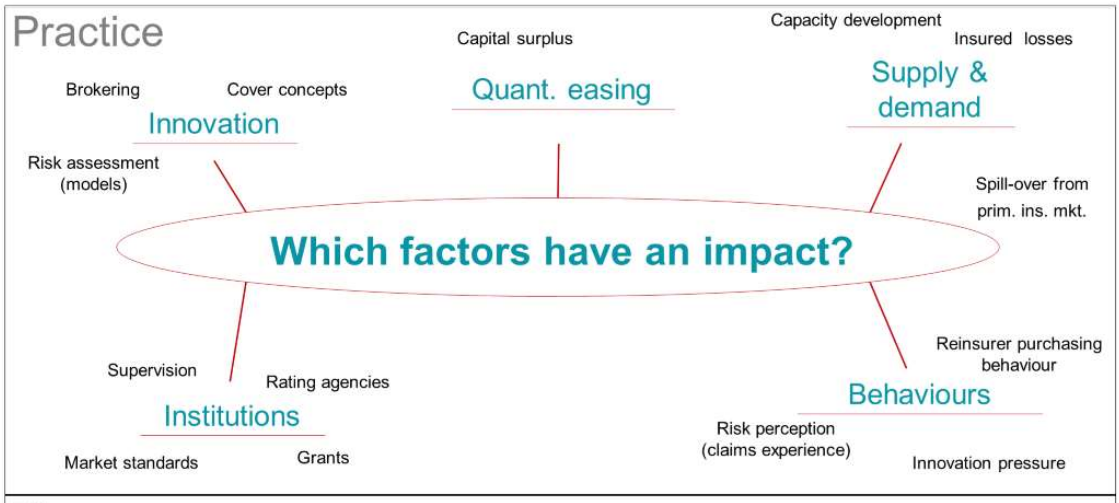
Technology
Arts Sciences
TH Köln

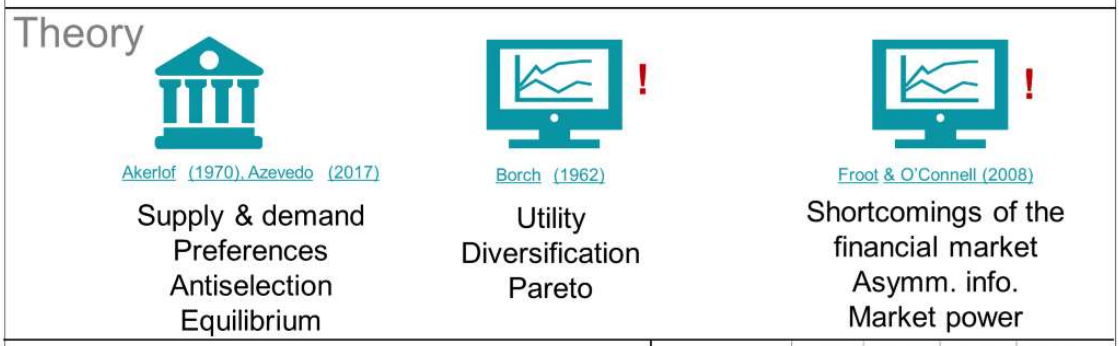
ivwKöln
Institut für Versicherungswesen

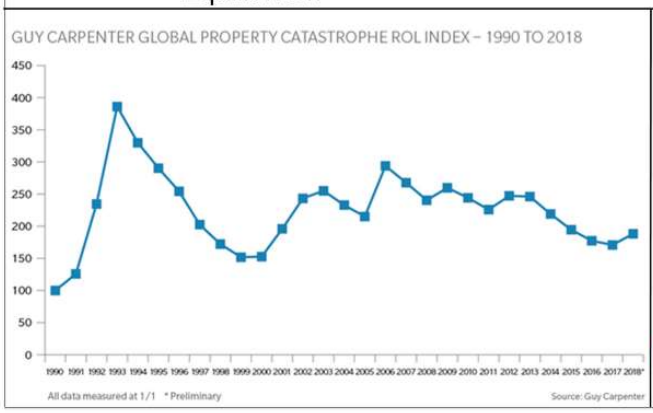
11th Annual Meeting of the Sponsoring Group Reinsurance Researchers' Corner, 13th July 2018

The Price of Risk Transfer

Robert Joniec, M.Sc. / FCII







	0	(-1)	(-2)	(-3)
Ins. vol.	-0.07	-0.05	0.97	-0.09
Reins. vol.	0.68	0.67	0.79	0.11
Total vol.	0.06	0.41	0.96	-0.18

Correlation between securitisation activity and insured losses in the same year (0) and one (-1), two (-2) and three (-3) years prior.

➡ **Reasons? Are there constants? Are there limits?**

Kai-Olaf Knocks: ‘The Drone Regulation and its (possible) impacts’
(cf. also project description p. 8)

Technology
Arts Sciences
TH Köln

ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers’ Corner, 13th July 2018

The Threat of Drones 2.0

Significant Changes in the Drone Regulation and Its (Possible) Impacts

Kai-Olaf Knocks, M.A., FCII

Regulation Governing the Operation of Unmanned Aircraft:

- Labelling requirement > 0.25kg
- Proof of knowledge > 2kg
- Permit requirement > 5kg
- No changes relative to liability and compulsory insurance cover

Relevance of the regulation in practical terms:

- For the vast majority of drones, only the labelling requirement applies
- Particularly for privately used drones, there is neither a requirement for proof of knowledge nor an operator’s permit

Typical insurance cover amounts:

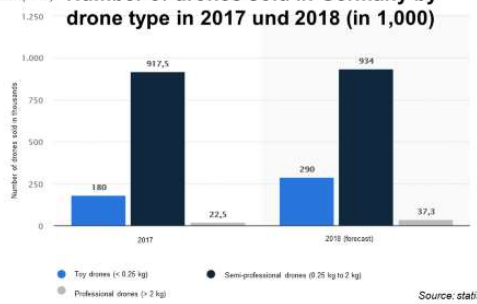
- Private use:
  - Included in private liability insurance – often in premium packages
  - Usually without sub-limit
- Commercial use:
  - Usually separate policies
  - Cover amounts up to EUR 10 m

Potential for loss:

- Sightings of drones per DFS:
  2015: 14 2016: 64 2017: 88
- Cyber
- Terror

Source: German Federal Ministry of Transport and Digital Infrastructure (BMVI)

Number of drones sold in Germany by drone type in 2017 und 2018 (in 1,000)



Source: statistika.com

Claims experience to date:

- Despite a sharp increase in the number of drones, the damage frequency is very low
- There are no reports of major loss

Conclusion

- The Drone Regulation goes in the right direction – but whether provisions will suffice remains open to question.
- While claims experience has been slight to date, a potential for loss definitely exists.

Fabian Pütz: ‘Reinsurance aspects of (networked) automated driving’
(cf. also project description p. 12)

Technology
Arts Sciences
TH Köln

ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers’ Corner, 13th July 2018

Reinsurance Aspects of (Networked) Automated Driving

Fabian Pütz (M.Sc. / cand. PhD)

Increasing demand for cat cover

I. Motor vehicle insurance

- Average loss due to NatCat events
- Cover of personal injury to the human ‘driver’
- Correlation of accident events (serial loss) possible
- Man-made cat risk possible through cyber attacks

II. Product liability

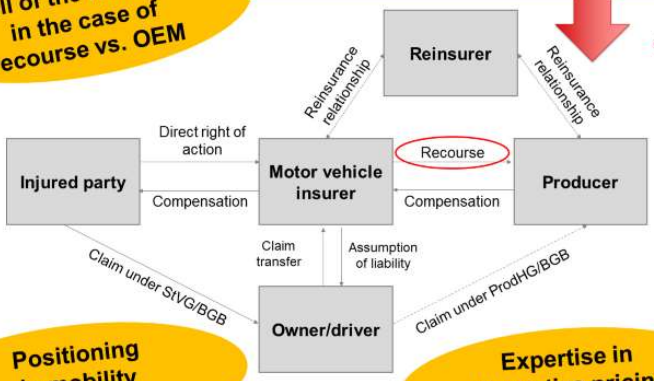
- Recourse of motor vehicle insurers possible pursuant to German Product Liability Act and German Civil Code

→ Recourse tends to only be efficient and viable for the motor vehicle insurer in the event of major loss

III. Product recall

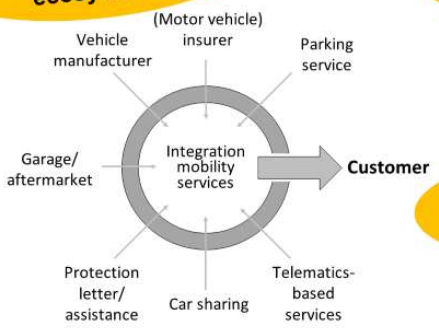
- Increased frequency of recalls expected
  - Complexity of vehicle infrastructure
  - Stricter implementation by supervisory authorities
  - Increasing innovation pressure in the automobile market
- Increasing magnitude of loss from recalls

Roll of the reinsurer in the case of recourse vs. OEM



- Vehicle primary insurer **not obligated, motivated or able** to carry through with recourse of basic loss (attritional losses); interest of reinsurers opposed in some cases
  - Pool of technical and legal expertise by reinsuerr more efficient
  - Reinsurer with overview of market has information advantage for ‘evidence’ vs. OEM

Positioning in mobility ecosystems



- Holistic, strategic cooperation with OEMs as suppliers of product and capacity
- Helping the motor vehicle primary insurer transform the business model

Expertise in alternative pricing methods

- increasing automation requires other forms of pricing of risks in the field of motor vehicles

→ Shift from driver-centric pricing towards risk assessment of the technical system

Reinsurer capacity for (cumulative) risks

Fabian Lassen: ‘Pooling of local natural disasters’
(cf. also project description p. 10)

Technology
Arts Sciences
TH Köln

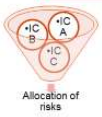
ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers’ Corner, 13th July 2018

Pooling of Local Natural Disasters

Fabian Lassen, M.Sc. / FCII

Insurance pool



‘The participating insurers throw their businesses together into a common pool and divide them up again among pool members on a quota basis.’

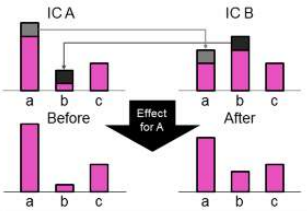
Fehlmann, Heinz (1948)

A **commission** can be used to adjust random deviations in the expected values. The commission amount is determined on the basis of the claims experience contributed. **Pool members with a good claims ratio will** receive **a commission** for future business brought in. The scheme can be financed through ongoing premiums, reduced guarantee funds or surpluses.

With the aid of a **balancing factor,** the quality of a portfolio is to be determined in advance. This is intended to specify a **risk-adequate pool premium** per member based on a country-specific risk profile. Risk assessment is based on a methodology that is understood as general, e.g. hazard zones.

Actuarial swap

In the case of an actuarial swap, actuarial **cash flows** with a comparable probability of occurrence and amount are **exchanged**.



The success of such a swap is mainly a function of the activating events and triggers selected.

A **multi-dimensional diversification effect across** the region and the risk class can be achieved and the **efficiency of the risk portfolio enhanced**.

The challenge is to identify hazards that exhibit the same probability of occurrence and a comparable level of expected loss. The **actual loss must correlate with the selected trigger.**

Conclusion

Insurance pool

- Complex administration
- Cash flow from contract conclusion
- Higher transaction costs through claims management
- Risk-appropriate valuation of portfolios to reduce subsidisation of pool members
- Risk-based bonus for lower-risk portfolios

Actuarial swap

- Less complex administration
- Cash flow only for a defined event
- Analysis of correlations between different hazards and regions is required to locate suitable hazard combinations
- Data quality is important
- No subsidisation of the partner
- Basic risk

➢ How do the parties involved react to one-sided increases in volatility?

➢ What steps can be taken to achieve a balance?

Lihong Wang: 'The Rising Middle Class in China and Its Implications for (Re)Insurance Industry'

(cf. also project description p. 12)

Technology
Arts Sciences
TH Köln

ivwKöln
Institut für Versicherungswesen

11th Annual Meeting of the Sponsoring Group Reinsurance Researchers' Corner, 13th July 2018

The Rising Middle Class in China and Its Implications for (Re)Insurance Industry

Lihong Wang, M.Sc./ FCII

Introduction

In stark contrast to the ongoing decline of the perceived middle class in the developed western world, China now has the largest middle class population of any nation. Nearly **400** million people are now considered middle class.

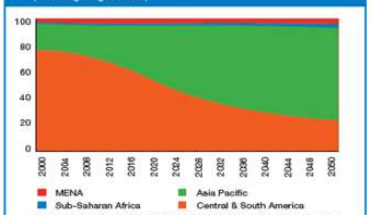
In the consequence of rising income and assets, insurance is becoming more relevant and of importance.

However, it is essential to understand who they are, where they are and how they spend their money. It is vital for (re)insurers to assess the implications and learn to tap into this new market.

The Size of Middle Calss, 2009 – 2030 (millions of people and global share) – Source: World Bank

	2009		2020		2030	
North America	338	18%	333	10%	322	7%
Europe	664	36%	703	22%	680	14%
Central and South America	181	10$	251	8%	313	6%
Asia Pacific	525	28%	1,740	54%	3,228	66%
Sub/Saharan Africa	32	2%	57	2%	107	2%
Middle East and North Arica	105	6%	165	5%	234	5%
World	**1,845**	**100%**	**3,249**	**100%**	**4,884**	**100%**

Global middle class consumption, 2000-50
(Percentage of global total)



Source: Kharas, Homi (2010), "The Emerging Middle Class in Developing Countries", *Development Centre Working Papers*, No. 285, OECD Publishing

The rising Middle Class populations are now expanding to North and the West, in Tier two to four cities.

Source: McKinsey Quartely, June 2013 on mapping China's middle class
https://www.mckinsey.com/industries/retail/our-insights/mapping-chinas-middle-class
Remarks: McKinsey grouped Chinese cities based on their economic development and political importance. Typically, Tier 1 cities have more than 15 million people, Tier 2 cities have 3 to 15 million people, Tier 3 and 4 cities have 150 000 to 3 million and fewer than 150 000 people respetively.

Chinese Middle Class

- Having been previously concentrated in the eastern coastal cities such as Beijing, Shanghai, and Guangzhou, they are now expanding to the western and northern parts of the country.
- Many of these citizens are starting to plan for their welfare and manage their finances, and are becoming a more mature and attractive market to retailers.
- They purchase things (high value, high tech items) such as private property, personal automobiles and take vacations overseas. They spend considerable amount of money on eating out, buying fine clothing and joining private clubs and gyms.
- They are a highly educated, highly productive and skilled labour force. Many hold a degree, speak at least one foreign language, are familiar with the Internet and truly the driving force behind China's internationalism.
- Similar to other Asian countries, such as South Korea and Japan, China will maintain a high saving ratio but keep spending more. Health insurance and Insurances with investment elements are especially in high demand.

In general, not only life but also non-life insurance sectors will be affected by this transformation. However, insurance companies have to cope with **product innovation and customer relationship management**. While the rising middle class demands new products and services, the underwriting results and claim patterns are yet to be revealed.

Implications for the (re)insurance Industry

- China remains as an attractive insurance market but a challenging new environment to operate.
- The internet usage is growing. China already has a large number of netizens (over 600 millions). Customer relationship management throughout the whole product life cycle has to be managed by online tools.
- Market practice changes rapidly. Are the indexation and exposure appropriate for reinsurance pricing?
- How will cost elements impact in terms of claims adjusting and triangle developments contributed by services being readily available and accessible?

Impressions of the 11th Annual Meeting of the Sponsoring Group Reinsurance

Excursions 2018

As every year, the Sponsoring Group Reinsurance made it possible for students with a concentration in the field of reinsurance, together with the academic staff of the Cologne Research Centre for 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 2018:

- Annual Meeting of German Association for Insurance Science [DVfVW], 20th - 22nd March 2018 in Munich.
- Colin Brett Seminar, 11th - 12th June 2018 at Cologne University of Applied Sciences.
- Reinsurance Conference 2018 from 21st -22nd October 2018 in Baden-Baden.
- On Friday, 8th December 2018, Mr Michael Rohde (Management Board Deutsche Rück) gave a guest lecture on the topic of 'Life reinsurance and investment in times of low interest-rate levels and additional interest rate reserve' to the students of the 1st Semester of the Master's programme.

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 92 companies involved. These are 61 risk carriers (with an approx. 85% market share worldwide) as well as 31 cedents and reinsurance-oriented service providers.

Current as at:
31st December 2018

The Cologne Research Centre for Reinsurance ensures bidirectional knowledge transfer between theory and practice, in particular to the Society for the Promotion of Reinsurance. It accomplishes this, firstly, via 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 Society for the Promotion of Reinsurance also financed two Germany scholarships in 2018 for students concentrating on the topic of reinsurance.

Publications of the Cologne Research Centre for Reinsurance

As of May 2019

2019

Materne, Stefan (Hrsg.): 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 (Hrsg.): Annual Report 2018 of the Cologne Research Centre for Reinsurance. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 2/2019.

Materne, Stefan (Hrsg.): 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), Nr. 02/2019, p. 30 - 32.

Pütz, Fabian: Reinsurance aspects of connected automated vehicles: Motor Insurance, in Versicherungswirtschaft (VW), Nr. 03/2019, p. 90 – 96.

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

2019 – Forthcoming

Pütz, Fabian: Führt das automatisierte Fahren zu einer materiellen Verlagerung von Haftungskosten auf die Herstellerseite?, in Versicherungspraxis (VP), 05/2019, p. 8-12.

2018

Böggemann, Jan: Optimierung des Einkaufs von Rückversicherung im Industrieunternehmen [Optimising Reinsurance Purchase in the Industrial Firm], Die VersicherungsPraxis, Fachzeitschrift für die versicherungsnehmende Wirtschaft, Ausgabe 6/2018, ISSN 0170 - 24 4 0, p. 6 – 7.

Materne, Stefan (Hrsg.): Jahresbericht 2017 der Kölner Forschungsstelle Rückversicherung [Annual Report 2017 of the Cologne Research Centre for Reinsurance]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 1/2018.

Materne, Stefan (Hrsg.): Annual Report 2017 of the Cologne Research Centre for Reinsurance. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 2/2018.

Materne, Stefan (Hrsg.): Proceedings of the Researchers' Corner for the 10th Annual Meeting of the Sponsoring Group Reinsurance. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 3/2018.

Schumann-Kemp, Brigitte: Bericht zum 15. Kölner Rückversicherungs-Symposium Rückversicherung 2018 – Retrozession 2018 – nach Harvey, Irma und Maria? [Retrocession 2018 – After Harvey, Irma and Maria?] Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 4/2018.

Materne, Stefan / Seemayer, Thomas: Rückversicherung [Reinsurance], in: Halm/Engelbrecht/Krahe (Hrsg.): Handbuch des Fachanwalts Versicherungsrecht, 6. Auflage, Köln

Materne, Stefan (Hrsg.): Proceedings des Researchers' Corner zur 11. Jahrestagung des Förderkreises [Proceedings of the Researchers' Corner for the 11th Annual Meeting of the Sponsoring Group Reinsurance]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 5/2018.

Joniec, Robert: Wetterrisiko – Entwicklung und Standardisierung neuer Deckungskonzepte [Weather Risk – Development and Standardisation of New Cover Concepts], Die VersicherungsPraxis, Fachzeitschrift für die versicherungsnehmende Wirtschaft, Ausgabe 8/2018, ISSN 0170 - 24 4 0, p. 20 – 21.

Lassen, Fabian / Eich, Markus / Materne, Stefan: Tausche Risiko, biete Entlastung - Wie die Senkung der Volatilität durch den Einsatz eines versicherungstechnischen Swaps gelingt [Willing to Trade Risk for Relief – How Use of an Actuarial Swap Reduces Volatility], in Versicherungswirtschaft (VW), Nr. 11/2019, p. 70-73.

Joniec, Robert: Weather Derivative Design in Wine Production: A Preliminary Study for Mediterranean Grapes, 1. November 2018 / Zeitschrift für Versicherungswesen (ZfV) 21|2018, p. 659 -662.

Pütz, Fabian: Was bedeutet das autonome Fahren für Herstellerhaftung und Opferschutz? [Effects of autonomous driving on manufacturer liability and victim protection], in VGA Nachrichten, Jahrgang 67,2018 – Nr. 3, ISSN 0170 – 96660, p. 111 – 112.

Pütz, Fabian: Die Auswirkungen automatisierter Fahrzeuge auf das Geschäftsmodell der Kfz-Versicherung: Die Wirkung von Rechts- und Motivationsaspekten auf das Regressverhalten des Kfz-Versicherers [The Impact of Self-Driving Vehicles on the Business Model for Automotive Insurance: How Aspects of Law and Motivation Affect the Recourse Behaviour of the Motor-Vehicle Insurer], 15. November 2018 / Zeitschrift für Versicherungswesen (ZfV) 22|2018, p. 697-700.

Lassen, Fabian / Eich, Markus / Materne, Stefan: Entwicklung eines länderübergreifenden Versicherungspools und anderer risikopolitischer Maßnahmen zur Reduzierung der Volatilität von lokalen Naturgefahren [Developing a Transnational Insurance Pool and Other Measures of Risk Policy to Reduce the Volatility of Local Natural Hazards]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 6/2018.

2017

Pütz, Fabian / Materne, Stefan: Alternative Capital und Basisrisiko in der Standardformel (non-life) von Solvency II [Alternative Capital and Basic Risk in the Standard Formula (Non-Life) of Solvency II]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 5/2017.

Materne, Stefan: Die US-Schäden testen die ILS-Investoren. [US Claims Are Testing ILS Investors] Interview in Versicherungswirtschaft heute, 04.12.2017, http://versicherungswirtschaftheute. de/maerkte-vertrieb/chinas-ruckversicherer-leiden-unter-regulierung.

Wang, Lihong: Dragon with Endurance – How China's Economic Slowdown Impacts the Insurance Industry, Versicherungswirtschaft (VW) 12/2017, p. 48-50.

Materne, Stefan: Chinas Rückversicherungsmarkt stagniert aufgrund zunehmender Regulierung [China's Reinsurance Market Is Stagnating Due to Increasing Regulation]. Interview in Versicherungswirtschaft (VW) 12/2017, p. 49.

Materne, Stefan (Hrsg.): Proceedings des Researchers' Corner zur 10. Jahrestagung des Förderkreises Rückversicherung am 7. Juli. [Proceedings of the Researchers' Corner for the 10th Annual Meeting of the Sponsoring Group Reinsurance] Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 4/2017.

Pütz, Fabian / Wichelhaus, Ingo / Materne, Stefan: Konzeption eines proportionalen Solvency Bonds zur Reduktion des vorzuhaltenden Risikokapitals für das Prämien- und Reserverisiko unter Solvency II [Conceptual Design of a Proportional Solvency Bond for Reduction of the Risk Capital Required for the Premium and Reserve Risk Under Solvency II], Zeitschrift für Versicherungswesen (ZfV) 21/2017, p. 660-662.

Schumann-Kemp, Brigitte: Bericht zum 14. Kölner Rückversicherungs-Symposium Rückversicherung 2017 – Protektionismus durch Regulierung? [Reinsurance 2017: Protectionism Through Regulation?] Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 3/2017.

Kaiser, Lucas: Bedeutung von Ratings für Rückversicherungsunternehmen [The Importance of Ratings for Reinsurance Companies]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 2/2017.

Materne, Stefan (Hrsg.): Jahresbericht 2016 der Kölner Forschungsstelle Rückversicherung [Annual Report 2016 of the Cologne Research Centre for Reinsurance]. Technische Hochschule Köln. Publikationen der Kölner Forschungsstelle Rückversicherung, Band 1/2017.

Materne, Stefan (Hrsg.): Forschungsbericht 2016 des Forschungsschwerpunkts Rückversicherung [Research Report 2016 of the Cologne Research Centre for Reinsurance]. In: Forschungsbericht für das Jahr 2016, Schriftenreihe Forschung am ivwKöln, Band 1/2017.

Hoos, Sebastian: Die (Rück-)Versicherung von Flüchtlingsunterkünften unter dem Blickwinkel der Terrorismusregelungen in der deutschen Sachversicherung [(Re-)Insurance of Refugee Accommodations from the Perspective of Anti-Terrorism Regulations in German Property Insurance], Zeitschrift für Versicherungswesen (ZfV) 01/2017, p. 25-27.

2016

Hoos, Sebastian: Die (Rück-)Versicherung von Flüchtlingsunterkünften unter dem Blickwinkel der Terrorismusregelungen in der deutschen Sachversicherung [(Re-)Insurance of Refugee Accommodations from the Perspective of Anti-Terrorism Regulations in German Property Insurance], Zeitschrift für Versicherungswesen (ZfV) 24/2016, p. 779-782.

Lassen, Fabian: Offshore Windparks und Rückversicherung [Offshore Wind Farms and Reinsurance], Zeitschrift für Versicherungswesen (ZfV) 21/2016, p. 658-660.

Pütz, Fabian / Engling, Matthias / Materne, Stefan: Die Bedeutung der Ereignisdefinition im Underwriting-Prozess des Rückversicherers [The Significance of the Definition of "Event" in the Reinsurer's Underwriting Process]. Technische Hochschule Köln. Forschung am IVW Köln, Band 9-2/2016 (2.Auflage). https://cos.bibl.th-koeln.de/frontdoor/index/index/docId/379

Lassen, Fabian / Kaiser, Lucas: Ist die Rückversicherung noch der Fels in der Brandung? [Is Reinsurance Still Solid as a Rock in Turbulent Waters?] Zeitschrift für Versicherungswesen (ZfV) 12/2016, p. 379.

Lassen, Fabian / Kaiser, Lucas: Ist die Rückversicherung noch der Fels in der Brandung? [Is Reinsurance Still Solid as a Rock in Turbulent Waters?] Versicherungspraxis (VP) 8/2016, p. 28.

Materne, Stefan: Rückversicherung: Anpassung des Geschäftsmodells ähnelt Kursänderung eines Tankers [Reinsurance: Adapting the Business Model is Similar to Changing Course in a Tanker], Bericht vom 31. Mai 2016, in: Versicherungswirtschaft-Heute, Tagesreport.

Materne, Stefan (Hrsg.): Jahresbericht 2015 des Forschungsschwerpunkts Rückversicherung [Annual Report 2015 of the Cologne Research Centre for Reinsurance]. Technische Hochschule Köln. (Forschung am IVW Köln, 2/2016). https://www.th-koeln.de/mam/downloads/deutsch/hochschule/ fakultaeten/wirtschafts_und_rechtswissenschaften/fsrv_jahresbericht_02_2016_v2_webversion.pdf

Materne, Stefan (Hrsg.): Forschungsbericht 2015 des Forschungsschwerpunkts Rückversicherung. [Research Report 2015 of the Cologne Research Centre for Reinsurance] Technische Hochschule Köln. (Forschung am IVW Köln, 1/2016). https://www.th-koeln.de/mam/ downloads/deutsch/hochschule/fakultaeten/wirtschafts_und_rechtswissenschaften/webversion_01_2016.pdf, p. 3-9.

2015

Axer, Jochen / Medert, Heiko Klaus / Voß, Birgit: Versicherungsteuergesetz – Kommentar [German Insurance Tax Act – Comment], Karlsruhe: Verlag Versicherungswirtschaft GmbH, 2015.

Pütz, Fabian: Die Bedeutung der Ereignisdefinition im Underwritingprozess des Rückversicherers [The Significance of the Definition of “Event” in the Underwriting Process of the Reinsurer], Zeitschrift für Versicherungswesen (ZfV) 21/2015, p. 711-712.

Wang, Lihong: Competitive Market - Employer’s Liability Business in China, Versicherungswirtschaft (VW) 11/2015, p. 40-42.

Knocks, Kai-Olaf / Materne, Stefan: Risiko Drohnen: Unbemannte Fluggeräte in der Haftpflichtversicherung [The Risk of Drones: Unmanned Aircraft in Liability Insurance], Zeitschrift für Versicherungswesen (ZfV) 18/2015, p. 587-590.

Materne, Stefan / Seemayer, Thomas: Rückversicherung [Reinsurance], in: Halm/Engelbrecht/Krahe (Hrsg.): Handbuch des Fachanwalts Versicherungsrecht, 5. Auflage, Köln, 2015, p. 2359 - 2399.

Materne, Stefan: Rückversicherer vor substantiellen Fragen: Hurrikane nicht das Thema [Reinsurers Presented with Substantial Questions: Hurricanes Not the Subject]. Bericht vom 12. Mai 2015, in: Versicherungswirtschaft-Heute, Tagesreport.

Hoos, Sebastian: Das Geschäftsmodell der Rückversicherer – den Herausforderungen gewachsen? [The Reinsurers’ Business Model: Up to the Challenges?]. Bericht zum 12. Kölner Rückversicherungs-Symposium vom 12. Mai 2015, in: Zeitschrift für Versicherungswesen (ZfV), Nr. 11/2015, p. 342-343.

Hoos, Sebastian: Das Geschäftsmodell der Rückversicherer – den Herausforderungen gewachsen? [The Reinsurers’ Business Model: Up to the Challenges?]. Bericht zum 12. Kölner Rückversicherungs-Symposium vom 12. Mai 2015, in: Versicherungspraxis (VP), Nr. 7/2015, S. 34.

Materne, Stefan: Im Bereich der Rückversicherung gibt es keinen Kopierschutz [There is No Copy Protection in the Field of Reinsurance], in: Versicherungswirtschaft (VW), Nr. 9/2015, p. 18-19.

2014

Materne, Stefan: Paradigmenwechsel bei Rückversicherern möglich [Paradigm Shift Possible Among Reinsurers], Interview zum 11. Rückversicherungssymposium in Köln, vom 15.05.2014, in: Versicherungswirtschaft-Heute, Tagesreport.

Hoos, Sebastian: Risikotransfer 2.0 – welche Rolle spielen die Rückversicherer? [Risk Transfer 2.0: What Role Do Reinsurers Play?], Bericht zum 11. Kölner Rückversicherungssymposium vom 15. Mai 2014, in: Zeitschrift für Versicherungswesen (ZfV), Nr. 12/2014, p. 355-356.

Hoos, Sebastian / Materne, Stefan / Wichelhaus, Ingo: Die Verbriefung von Langlebigkeitsrisiken durch Longevity Bonds - Darstellung anhand zweier Praxisbeispiele [The Securitisation of Longevity Risk through Longevity Bonds: Presentation Based on Two Practical Examples], in: Zeitschrift für Versicherungswesen (ZfV),

- Part 1 in Nr. 11/2014, p. 327-331,
- Part 2 in Nr. 12/2014, p. 365-368.

Hoos, Sebastian / Heep-Altiner, Maria: Vereinfachter Nat Cat Modellierungsansatz zur Rückversicherungsoptimierung [Simplified Nat Cat Modelling Approach for the Optimisation of Reinsurance], in: Forschung am IVW, März 2014.

Knocks, Kai-Olaf: Kapitalzufluss im Cat-Bond-Markt – Günstiges Umfeld für Risikosponsoren [Capital Inflow in the Cat-Bond Market: Favourable Environment for Risk Sponsors.

2013

Wang, Lihong: Positive increase of insurance density and penetration in China, in: Versicherungswirtschaft (VW), Heft 22/2013, p. 36 - 38.

Knocks, Kai-Olaf: Das Ende der Zyklen [The End of the Cycles], in: Versicherungswirtschaft (VW), Heft 12/2013, p. 69.

Materne, Stefan / Seemayer, Thomas: Mitrückversicherung Co-Reinsurance], in: Lüer, Dieter / Schwepcke, Andreas (Hrsg.): Rückversicherungsrecht, München, Verlag C.H. Beck, 2013, p. 693-730.

2012

Knocks, Kai-Olaf / Seemayer, Thomas: Geschäftsmodelle in der Rückversicherung - für die Zukunft gerüstet? [Business Models in Reinsurance: Equipped for the Future?], Das 9. Kölner Rückversicherungs-Symposium, in: Zeit-schrift für Versicherungswesen (ZfV), Heft 13-14/2012, p. 415-416.

Wang, Lihong: Case Study Passenger Carrier Liability (PCL) Insurance in China, in: Zeitschrift für Versicherungswesen (ZfV), Heft 21/2012, p. 687-690.

2011

Reimers-Rawcliffe, Lutz: Eine Darstellung von Rückversicherungsprogrammen mit Anwendung auf den Kompressionseffekt [A Presentation of Reinsurance Programmes with Application to the Compression Effect], in der Publikationsreihe Forschung am IVW, Nr. 5/2011.

Knocks, Kai-Olaf / Materne, Stefan: Kosten von Catbonds – Einflussfaktoren und aktuelle Tendenzen [Cost of Cat Bonds: Influencing Factors and Current Trends], in: Zeitschrift für Versicherungswesen (ZfV), Heft 21/2011, p. 707-714.

Knocks, Kai-Olaf / Materne, Stefan: Positive Aussichten für Katastrophenanleihen [Positive Outlook for Catastrophe Bonds], in: Versicherungswirtschaft (VW), Heft 15/2011, p. 1075-1081.

Knocks, Kai-Olaf / Seemayer, Thomas: Wendepunkt in der Rückversicherung? [Turning Point in Reinsurance?] Das 8. Kölner Rückversicherungssymposium, in: Zeitschrift für Versicherungswesen (ZfV), Heft 12/2011, p. 422-423.

Materne, Stefan / Seemayer, Thomas: Rückversicherung [Reinsurance], in: Halm / Engelbrecht / Krahe (Hrsg.): Handbuch des Fachanwalts Versicherungsrecht, 4. Auflage, Köln, Luchterhand, 2011, p. 2545-2586.

2010

Seemayer, Thomas: Die EU-Sektoruntersuchung zu den Unternehmensversicherungen: Meistbegünstigungsklauseln in Rückversicherungsverträgen unter Berücksichtigung des Kartellrechts [The EU Sector Inquiry into Corporate Insurance: Most-Favoured-Nation Clauses in Reinsurance Contracts, Taking Antitrust Law into Account], in Zeitschrift für die gesamte Versicherungswissenschaft (ZVersWiss) (2010) 98, p. 603 – 612.

Delbrück, Hans-Helmuth / Seemayer, Thomas: D&O im Versicherungskonzern – Lücken im Selbstbehalt? [D&O in the Insurance Group: Gaps in the Deductible?], in Versicherungswirtschaft (VW), Heft 21/2010, p. 1512-1514.

Materne, Stefan / Schnusenberg, Oliver: Sprechen Sie Bias? An investigation of cultural differences in behavioral finance biases between Germany and the United States, in: Journal of Behavioral Studies in Business <http://www.aabri.com/jbsb.html> (19. September 2010).

Axer, Jochen / Seemayer, Thomas: Die Neuausrichtung der Vorstandsvergütung bei Versicherungsunternehmen: Idee, Regelungsgehalt und Zielsetzung [The Realignment of Management Board Remuneration in Insurance Companies: Idea, Regulatory Content and Objective], in Zeitschrift für Versicherungswesen (ZfV), 2010, Nr. 14 p. 510 ff. (part I.) und Nr. 15/16 p. 552-555. (part II).

Knocks, Kai-Olaf / Materne, Stefan: Grenzen und Herausforderungen bei der Verbriefung von Versicherungsrisiken [Limits and Challenges of Securitisation of Insurance Risks], in: Zeitschrift für Versicherungswesen (ZfV), Heft 11/2010, p. 767-771.

Seemayer, Thomas: Der Ereignisbegriff in Schadenexzedentenverträgen in der Rückversicherung von Haftpflichtrisiken [The Concept of 'Event' in Excess-of-Loss Reinsurance of Liability Risks], Schriftenreihe des Instituts für Versicherungswesen der Fachhochschule Köln, Karlsruhe, Verlag Versicherungswirtschaft, 2010.

Seemayer, Thomas / Materne, Stefan: Viele Ereignis-Begriffe verderben die Rück-deckung in Haftpflicht ['Lots of Event Terms Spoil the Reinsurance in Liability'], in Versicherungswirtschaft (VW), Heft 5/2010, p. 356-360.

Seemayer, Thomas: Entwendungstatbestände in der Fahrzeug-Kaskoversicherung – zugleich Anmerkung zu OLG Köln [Offences of Theft in Motor-Vehicle Hull Insurance: At the Same Time a Note on the Higher Regional Court of Cologne], vom 22. Juli 2008 in: Recht und Schaden (r+s) 2010, p. 6-11.

Materne, Stefan / Knocks, Kai-Olaf: Verbriefung von Versicherungsrisiken – Alternativer Risikotransfer für Industrieunternehmen? [Securitisation of Insurance Risks: Alternative Risk Transfer for Industrial Firms?], in: Die VersicherungsPraxis, Heft 1/2010, p. 4-9.

2009

Materne, Stefan / Seemayer, Thomas: Die kartellrechtliche Behandlung der Praxis der Meistbegünstigung in der EU-Sektoruntersuchung [The Antitrust Treatment of Most-Favoured Nations in the EU Sector Inquiry], in: VersicherungsRecht (VersR) 2009, Heft 28/2009 p. 1326-1333.

Knocks, Kai-Olaf: Auch im K-Markt kann sich Verbriefung von Risiken lohnen – Bilanzielle Auswirkungen am Beispiel der Sparc Europe [Even in the K Market, Securitisation of Risks May Pay Off: Accounting Implications Based on the Example of SPARC Europe], in: Versicherungswirtschaft (VW), Heft 14/2009, p. 1124-1126.

Materne, Stefan / Seemayer, Thomas: Die Aufsicht über Mixed Insurance Compa-nies nach dem VAG [The Supervision of Mixed Insurance Companies under the German Insurance Supervision Act], in: Zeitschrift für Versicherungswesen(ZfV), Heft 14/2009 p. 466-467.

Seemayer, Thomas: Höhere Preise, mehr Eigendeckung, Wunsch nach Vielfalt: Die Rückversicherer und die Finanzkrise [Higher Prices, More Equity Coverage, Desire for Diversity: The Reinsurer and the Financial Crisis], in: Zeitschrift für Versicherungswesen (ZfV), Heft 13/2009, p. 428-430.

2008

Materne, Stefan / Diehl, Frank: Rückversicherung [Reinsurance], in: Halm / Engelbrecht / Krahe (Hrsg.): Handbuch des Fachanwalts Versicherungsrecht, 3. Auflage, Köln, Luchterhand, 2008.

Seemayer, Thomas: Rückversicherer – Ruhe vor dem Sturm? [Reinsurers: Calm before the Storm?], in: Zeitschrift für Versicherungswesen (ZfV), Heft 13/2008, p. 423-424.

Seemayer, Thomas: Verbriefung von Versicherungsrisiken – Zum Vortrag von Prof. Stefan Materne [Securitisation of Insurance Risks: On the Lecture by Prof. Stefan Materne], in: Versicherungsbetriebswirt (VB), Heft 4/2008, p. 115.

Publisher's details

This document has been issued as part of a series of publications by the Cologne Research Centre for Reinsurance. A complete overview of all previous publications can be found at the end of this publication.

Publikationen der Kölner Forschungsstelle Rückversicherung, 2/2019
ISSN 2567-6652

Prof. Stefan Materne (ed.): Annual Report 2018 of the Cologne Research Centre for Reinsurance

Schriftleitung / editor's office:

Prof. Stefan Materne

Lehrstuhl Rückversicherung
Chair of Reinsurance

Leiter der Kölner Forschungsstelle Rückversicherung
Director of the Cologne Research Centre for Reinsurance

Institut für Versicherungswesen /
Institute for Insurance Studies

Fakultät für Wirtschafts- und Rechtswissenschaften /
Faculty of Business, Economics and Law

Technische Hochschule Köln /
Cologne University of Applied Sciences

Gustav Heinemann-Ufer 54
50968 Köln / Cologne
Germany

Mobil + 49 171 7789 265
Mail stefan.materne@th-koeln.de
Web www.th-koeln.de

Gutachter / reviewer:

Ingo Wichelhaus

Vorstand BVZL International
Executive Board, BVZL International

Mobile + 49 171 5642 673
Mail ingo.wichelhaus@bvzl.de