

THE EUROPEAN ACTUARY

TRIENNIAL MAGAZINE OF THE ACTUARIAL ASSOCIATION OF EUROPE

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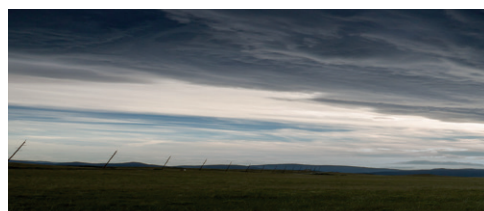
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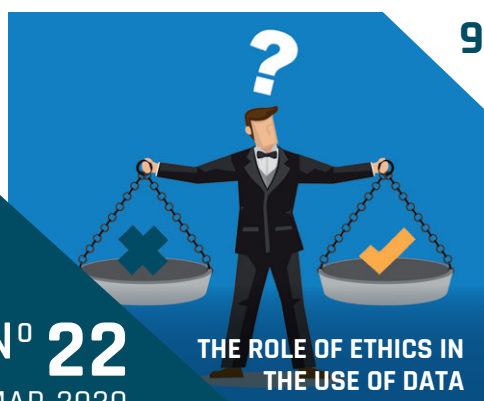
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COLUMN

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LOOKING AHEAD

WITH SKILLS AND SUPPORT

INTERVIEW BY
JENNIFER BAKER

Planning for the future is the lifeblood of the actuarial profession, also in their own careers, so The European Actuary caught up with Henning Wergen, Chair of the AAE Education Committee, to find out what sort of education and life-long learning is required.

Are actuaries highly regarded as professionals? Are enough younger people considering the profession?

‘Within financial services actuaries are well known and highly regarded as professionals. We are a very specialised profession with a skillset that helps to underpin business decision-making with mathematical and statistical rationale. Especially in the last couple of years actuaries have been moving into the so called ‘wider fields’. These include investment, enterprise risk management, but also climate change or data science applications in almost all areas of (insurance related) business. Of course, many other professions work in those wider fields, but the actuarial skills needed are not that different and can also be used in traditional actuarial areas.’



What skills are inherent in the best actuaries? Are these traits or can they be taught?

‘The basic foundation is that actuaries need to have an understanding of mathematics and should like to solve problems by using numbers and data. Starting from this basis, the actuarial qualification adds different pillars to this. Advanced methods in stochastics, a solid understanding of the economic environment, business acumen, ethical questions – especially around the use of (big) data – and communication skills. The last one is perhaps something that many actuaries need to learn and to develop. How can we communicate within our companies or towards external stakeholders what results mean or what limitations models have? This is an area where our profession needs to deepen the general skills.’

AI is increasing in all careers. How will automation impact the actuary's role? What sort of additional training is needed for this?

‘Like in many other areas, standardised actuarial tasks will be performed automatically more and more in the years to come. This on the other hand means that AI applications need preparation and interpretation of the results. For example, actuaries have to make sure that regulatory needs are met. Algorithms almost always need explanation and cannot be a black box to be accepted by customers or supervisors. This is where our profession will have an important role to play.’

No career is static. How does the actuarial profession compare to others in this regard?

‘What makes actuaries special is the unique combination of mathematical and statistical skills used in a business context backed by professional standards such as a code of conduct or requirements for ongoing personal professional development. It is no surprise that those are core competencies of the

harmonised European education requirements for actuaries. This in the end leads to our Mutual Recognition Agreement of actuarial qualifications within the member associations of the AAE.’

What sort of ongoing training is needed to cope with the challenges of the constantly evolving business and technological environment?

‘Basic education includes, for example, modern statistical methods such as the understanding of machine learning techniques. This is just one of almost 250 explicit learning objectives in the AAE Core Syllabus for Actuarial Training that has just been updated to fit the expectations of our profession. But of course in an ever-evolving business environment you cannot only rely on the things you have learned in the past. That is why actuaries are bound to a self-commitment to keep their own knowledge and skills up-to-date.’

Specialisation is a part of building a career. How can actuaries harness the options open to them?

‘Today actuaries already work in many different areas. Of course, there are the very traditional tasks in the insurance industry around pricing or reserving. These will not vanish, but change in the coming years. On the other hand, more and more data is available. Actuaries are not hard core data scientists. And, they do not need to be. But, actuaries have the perfect skill set to make use of and understand data analytic methods to prepare a business decision. This is our strength and many opportunities will arise for individual actuaries in the next couple of years.’

JENNIFER BAKER is a freelance EU Correspondent reporting tech policy, digital rights & Brexit for Euractiv, Euronews, TheNextWeb, IAPP, BBC radio and more.

UNIMAGINABLE EVENTS: A WORRYING 'CONSTANT UNKNOWN'

BY **GIAMPAOLO CRENCIA**

What is an unimaginable event? It isn't easy to define. In a thesis developed in the Marche Polytechnic University of Economy in Ancona, by the student Di Marcoberardino Davide, it is proposed that such an event should satisfy at least one of the following characteristics:

- to be 'unknown' prior to the occurrence of the event, in the sense that nobody ever mentioned the possibility of such an event occurring;
- to be record-breaking in terms of importance, damages or number of victims;
- to have occurred for the first time in a certain geographical area;
- to have occurred before in a certain area, but never with that importance or features.

Applying this definition to a Swiss Re database including all the catastrophic events that occurred in the period from 2002 to 2017, yielded 36 events that can be considered 'unimaginable'.



After Vaja storm

This research is a first attempt to study this phenomenon. Due to their nature, these events are not standard and it is difficult to analyse them using standard actuarial representations and tools. For this research, in spite of the heterogeneity of the selected risks, the unimaginable events are considered together, with their unimaginability being the common thread that binds them together. Thus, in order to be able to proceed, the 36 events were considered as a homogeneous group.

These events were analysed regarding the number of the events per year (Poisson distribution), the economic impact (damage per event; Exponential distribution) and the aggregate annual damage (Log-normal distribution).

The analysis of data and distributions shows a very high probability to have at least one unimaginable event every year (89.5%) and a high probability to have at least two unimaginable events (65.8%).

When we look at the size of the events, we see that there is a very high probability (86,4%) to have a damage over one billion. This is an indicator that quantifies the qualitative requirements embedded in the definition of 'unimaginable event'. The damage disregards the insurance compensation and there isn't available data to establish how much of the damage is insured.

About the annual aggregate damage, there is only a minimum probability (2,8%) that in one year this is below 200 billion dollars; this is a further confirmation about what previously stated.

The data presented shows that unimaginable events are both frequent and large. They can be seen as a 'constant unknown' because, while they are unknown, heterogeneous and unpredictable, they occur with a worrying frequency.

Future efforts in this field would involve improvement in the model, to check how much of the amount of aggregate annual damages is insured and enlarging the data base over time as more events occur, in order to better represent these seriously harmful events.

GIAMPAOLO CRENCA
is President ISOA

TABLE 1: $f(x)$ and $F(x)$ - Number of yearly unimaginable events - Poisson distribution – basic data. *Source: Swiss-Re*

number of claims	$f(x)$	$F(x)$
0	0,1054	0,10540
1	0,2371	0,34255
2	0,2668	0,60934
3	0,2001	0,80943
4	0,1126	0,92199
5	0,0506	0,97263
6	0,0190	0,99163
7	0,0061	0,99773
8	0,0017	0,99945
9	0,0004	0,99988
10	0,0001	0,99998

TABLE 2: $f(x)$ e $F(x)$ – Amount of damages per event - Exponential distribution – basic data. *Source: Swiss-Re*

amount classes	$f(x)$	$F(x)$
< 1.000.000	0,000146775	0,000146775
1.000.000 - 10.000.000	0,001320002	0,001466776
10.000.000 - 50.000.000	0,005845622	0,007312398
50.000.000 - 200.000.000	0,021617929	0,028930328
200.000.000 - 1.000.000.000	0,107590326	0,136520654
1.000.000.000 - 5.000.000.000	0,383458863	0,519979516
5.000.000.000 - 10.000.000.000	0,249600819	0,769580335
10.000.000.000 - 50.000.000.000	0,229770137	0,999350472
> 50.000.000.000	0,000649528	1

TABLE 3: $f(x)$ e $F(x)$ – Amount of aggregate annual damages- Log-Normal distribution – basic data. *Source: Swiss-Re*

aggregate damage band per year	$f(x)$	$F(x)$
< 200.000.000	0,028035	0,028035
200.000.000 - 600.000.000	0,090943	0,114528284
600.000.000 - 1.500.000.000	0,152366	0,258188996
1.500.000.000 - 3.000.000.000	0,156197	0,414385998
3.000.000.000 - 6.000.000.000	0,169474	0,583860065
6.000.000.000 - 10.000.000.000	0,118304	0,702164274
10.000.000.000 - 20.000.000.000	0,130830	0,832994272
20.000.000.000 - 40.000.000.000	0,086161805	0,919156077
> 40.000.000.000	0,080843923	1

THE DEVELOPMENT OF A EUROPEAN ACTUARIES CLIMATE INDEX

BY **PHILIP SHIER**



BACKGROUND

The first Actuaries Climate Index (**ACI**) was developed in North America, sponsored jointly by the American Academy of Actuaries, the Casualty Actuarial Society, the Canadian Institute of Actuaries, and the Society of Actuaries. This went live in November 2016. In 2018, the Actuaries Institute Australia released the first results of its climate index (**AACI**).

The Board of the AAE established a Working Group (WG) in February 2019 to investigate the feasibility of producing a European Actuaries Climate Index (EurACI). The WG, which includes members from 15 associations, has undertaken a detailed analysis and has had the benefit of discussions with the ACI working group in

North America, which has helped to identify the key issues to be addressed in developing a EurACI.

The initial report of the WG to the Board in October 2019 concluded that the development of a EurACI, similar to the ACI and AACI, was feasible and indeed desirable, but noted that further work was needed to firm up on data availability and the likely costs of development and maintenance of the index.

The AAE Board is considering how best to meet these costs, including the possibility of seeking funding from European bodies. This article will focus on the issues which need to be considered in deciding on the datasets to use, and how to ensure the

quality, reliability and availability (including historic information) of the data which is input to the model.

STRUCTURE OF THE ACI

The ACI is based on analysis of seasonal data for six index components collected since 1961. The index measures changes in extremes of high and low temperatures, high winds, heavy precipitation, and drought, as well as changes in sea level, expressed in units of standard deviations from the mean for the 30-year reference period of 1961 to 1990, for the United States and Canada combined and by region. Combining six components over a five-year measurement period, the index's moving average smooths out monthly and seasonal fluctuations for a meaningful measurement of long-term climate trends.

Further detail on the construction of the ACI and the data sources used are available on the [website](#).

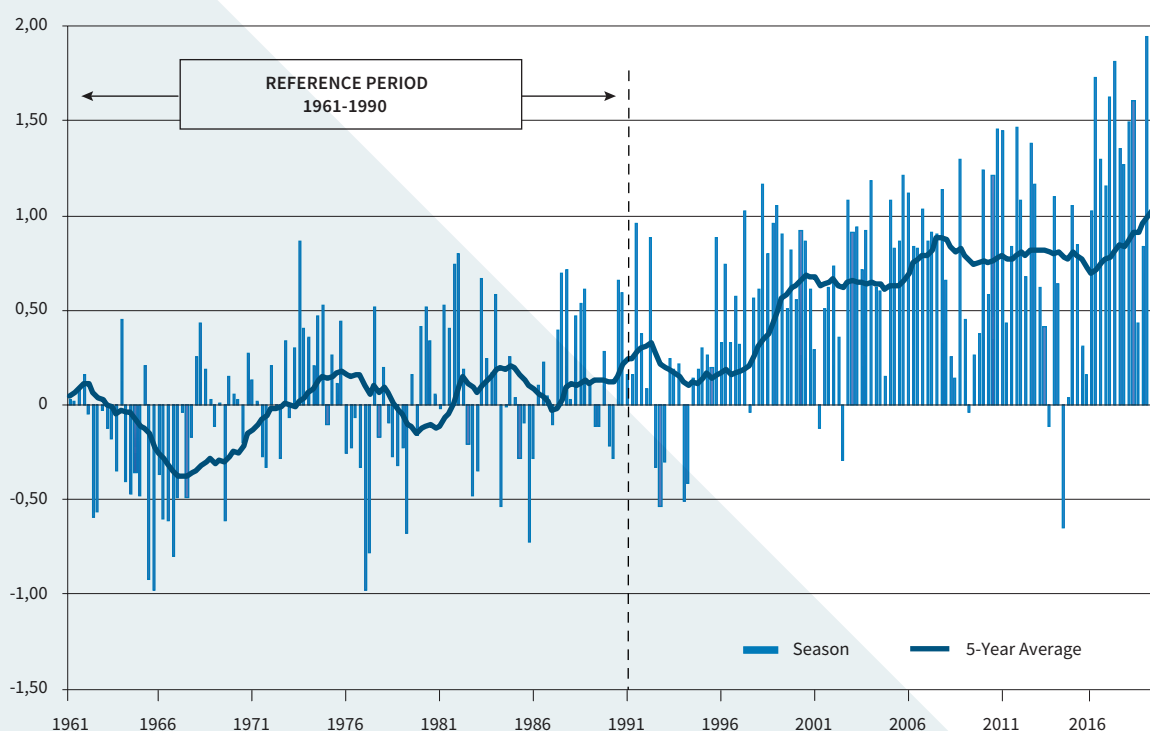
The most recent **update** was issued in November 2019. As can be seen from the chart below, the ACI's five-year moving average continues to rise and for the fifth consecutive quarter has set a new high.

DATA ISSUES

The ACI uses gridded datasets for all of the components except mean sea level. Each of these grids covers an area of 2.5 degrees latitude by 2.5 degrees longitude, and the data values are in effect averages over that area. This provides more manageable amounts of data, which have been collated and checked by the data provider. However, the use of gridded datasets does lose some valuable information where the area covered by a grid is not homogenous with regard to climate, and it relies on the dataset provider to check the reasonableness of the data and to deal with any gaps due to missing data. In our discussions with the ACI working group, they have indicated that for the next version of ACI they are minded to use individual station data to address these concerns. The AACI is based on individual station data.

The **European Climate Assessment & Dataset** (ECA&D), which is based in Utrecht, collates data provided by European meteorological services, and produces gridded data sets for Europe. Members of the WG had a very useful meeting with ECA&D in September 2019, and based on these discussions and further information subsequently provided, the WG is

FIGURE 1: ACTUARIES CLIMATE INDEX - USA & CANADA





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of the view that these datasets (which are freely available) could be used to develop a EurACI.

A final decision on whether to use gridded datasets or individual weather station data has not yet been reached. The key question is whether the benefit of having more granular data is greater than the additional resources (time and cost) which would be required to validate and process them.

In either case, the question of missing data will need to be addressed, as the availability of readings in some parts of Europe is quite limited. The gaps may be filled by the use of reanalysis but this does introduce a level of approximation which might not be considered acceptable. It may be necessary, at least initially, to limit the scope of the Index to those parts of Europe where there is sufficient data to be credible.

Another possibility is to use satellite data, and the WG has had some interesting discussions with a provider of satellite data, Space4Climate, in this regard.

USAGE OF THE INDEX

The Index will provide information on trends in the frequency of extreme events that could be attributed to climate change. Although no final decisions have been taken on how this will be made available, it is likely that quarterly updates will be published on the AAE website, similar to those published by **ACI** and **AACI**. No decision has yet been taken on what, if any, sub-indices covering different regions or countries might be produced; this will depend crucially on the availability of sufficient data to make the sub-indices credible, and on the additional value which sub-indices might provide in return for the additional work involved.

Climate indices provide useful information for actuaries, insurers, regulators and policy makers in relation to the frequency of the occurrence of extreme climate events. They do not provide information on the losses which arise due to these events. The ACI working group are working on the development of an Actuaries Climate Risk Index, which would incorporate information on the losses arising from past events which could be of assistance in setting reserves and capital requirements and indeed pricing for such risks, and the American Academy of Actuaries has recently published the **preliminary findings** of this research.

NEXT STEPS

The WG will finalise its recommendation to the AAE Board shortly, and if the Board decides to progress the development of the EurACI, it will commence the project with a view to having an Index available as soon as possible. This may require some pragmatic decisions to be taken about the level of data quality and scope of the index, rather than delaying significantly the production of an Index in the pursuit of perfection. An ambitious target would be to have developed the Index by the end of 2020, with the first results being published in early 2021.

The AAE will need to establish governance procedures in relation to the publication of the Index and to keep it under constant review; in time, this might lead to more detailed outputs and to the development of a risk index.

Ultimately, the target should be a global actuaries climate index, which is likely to rely significantly on satellite data to cover the oceans as well as land areas where reliable data is sparse.

THE ROLE OF ETHICS IN THE USE OF DATA



BY **ESKO KIVISAARI**

The amount of digital data increases today at an exponential pace. We talk this year of 40 zettabytes of data, with the amount increasing by 60 % per annum. Even for actuaries a zettabyte ($=10^{21}$ bytes = 1000 exabytes = billion terabytes) is a fairly large number.

The data as such has of course always existed. The problem has been that it has existed in a form that is impossible or expensive to collect and, even when it is accessible, its manipulation has been slow and costly. One example of this is our genetic code (we have

about 1.5GB each). It has naturally existed (at least?) as long as there has been life on earth. Deciphering the genetic code by humans has however happened only fairly recently.

The data revolution has created a huge need for data science, i.e. better knowledge and technology of understanding what can be derived from the data we now have in digital form. Increasing efficiency in equipment (computing power, storage space, price etc.) is all the time making manipulating of the data more efficient, as the so-called Moore's law about the

increase in computing power still seems to be valid.

The problem we have at hand is in essence whether we really and credibly understand what can be found out from the data. We can again refer to the genetic code. While we have the deciphered genetic code at hand we are still far from understanding everything that can be derived from this code.

Insurers and actuaries serving the sector have through all their history been dataholics – i.e. they have tried to use the best available data concerning the insured pools with the best possible technology. The better one knows the details concerning each insured, the better one is able to correctly price the risks and consequently manage the pool.

There have been important bottlenecks in this area. Collection of data has been expensive, if not impossible, and its manipulation has been slow and costly. The solution has been to use simple and easily verifiable proxies. Typical examples of these are e.g. age and gender in life and pension insurance. We know that, at least in principle, one would know more than what is revealed by age and gender of an insured if one were able to know the shopping basket of this person for the last ten years, the purchases from the pharmacy, how often this person goes to the

gym etc. And certainly again, at least in principle, the genetic code would reveal a lot.

Modern predictive analytics holds large promises in this area. In discussions on Big Data reference is made to the so-called four V's: volume, velocity, variability and veracity (sometimes there are more V's added, like value). While there remains a lot to be done with data science one can think that in principle, with developed predictive tools, one would have very exact information based on this data. This could be done in a very cost-efficient manner.

‘an actuary must not provide information ... that the actuary knows is materially false or misleading, ...’

There are two obvious technical obstacles to be tackled. The first one is that there remains a lot to do in the development of the predictive tools involved. One of the dangers is that the models can become very complicated which might create a false sense of certainty and hide the deficiencies involved. The second difficulty lies with the fourth V among the four V's, i.e. veracity. When the data comes in many different forms the analyst must take extra care with respect to the validity of the data.

Along with these technical obstacles there is the ethical side of the issue. Insurance should always benefit the society. There are already now examples outside of the insurance sector where data and analytics is used in ways that are not beneficial. While novel tools have great promises for the better management of insurance risks they also contain the possibility of applying predatory policies towards clients.

This ethical concern is taken seriously in the European Union. The High Level Expert Group on Artificial Intelligence set up by the EU Commission has worked on this concern at a general level. It has produced in April 2019 its report on the **Ethics Guidelines for Trustworthy Artificial Intelligence**.

Based on the work of the High Level Expert Group but also anticipating potential problems the European Insurance and Occupational Pensions Authority (EIOPA) established in September, 2019 its Consultative Expert Group on Digital Ethics in Insurance. EIOPA has before this published its **thematic review on the use of Big Data Analytics (BDA) in motor and health insurance**. EIOPA established the Consultative Expert Group to assist the Authority in the development of digital responsibility principles in insurance.

As European actuaries we are committed to the principles of our Code of Professional Conduct: integrity, competence and care, compliance, impartiality and communication. As an element of this ‘an actuary must not provide ... information ... that the actuary knows ... is materially false or misleading, contains statements or information furnished recklessly or omits or obscures information required to be included and as a result is materially misleading’. Further on ‘an actuary must perform specific professional services only if the actuary is competent and appropriately experienced to do so...’. These are very demanding requirements generally, but perhaps even more so when we talk of novel data science and predictive analytics.

Actuaries have based on their education and experience much to gain from the modern tools. At the same time we need to be careful that the models developed are sound and that data is used in an ethical manner. Actuaries’ code of professional conduct will guide the individual actuary to make good use of his/her skills. As actuaries, we also know of enough historical cases where models have been used recklessly; with such background we can support data science in not repeating the mistakes actuaries have already done in the long history of the profession.

The EIOPA group will address the use of new business models, technologies and data sources in insurance from the perspective of fairness; taking into account ethical considerations. Specific focus will be given to pricing and underwriting, given their specific importance in the insurance sector. However, other elements of the insurance value chain will also be addressed.

‘The actuarial profession is thus in the forefront of fostering the role of ethics in the use of data!’

Actuaries have a strong role in the new EIOPA group. The AAE proposed two persons to the group and they (including the author) were both approved. Furthermore, several actuarial associations proposed candidates to the group and some actuaries were recommended by their employers. The result is that, if we think of different professions represented in the group, actuaries now constitute the largest profession represented.

The actuarial profession is thus in the forefront of fostering the role of ethics in the use of data!



ESKO KIVISAARI

is Immediate Past Chairperson of the Actuarial Association of Europe and Deputy Managing Director of the Federation of Finnish Financial services

EXCITING NEW COOPERATION: AAE & ACTUVIEW

BY **FALCO VALKENBURG**

The Actuarial Association of Europe expands its strategic activities to support its Member Associations securing the high expertise and reputation of all actuaries in Europe.

For all of its activities, the Actuarial Association of Europe has given itself Strategic Objectives. These are clear guidelines for what the AAE strives to achieve to promote the profession and to support its member associations across Europe. Individual activities – within the committees and outside the association, together with the member associations, the individual actuaries and a large number of external stakeholders and partners – are derived from these objectives.

As described, critical aspects the objectives are aiming at is the education and continuous professional development (CPD) of actuaries. These areas are central pillars for the recognition of actuaries as competent professionals in the areas in which they practice. As they play important roles in the insurance sector, in pensions, in social security and in risk management, the reputation of the individual actuary as well as of the profession as a whole, is key for the recognition in the public sphere.

And especially today, lifelong learning as well as the ability to keep

track of the latest developments, technologies and trends is of particular importance. The ongoing digital change affects all areas of modern life and naturally does not stop at actuaries and the daily challenges they face. Besides this, regulations and market parameters change and influence which assessments actuaries have to make, what reports they have to write and how new products can be developed. The insurance industry is therefore very much in need of not just well-trained but also continuously updated experts.

Against this backdrop, the AAE has initiated a number of activities within the last year. Next to starting a general discussion on the overall CPD strategy for the umbrella association, recently the AAE has entered a cooperation with direct practical benefits for its member associations: a partnership with the international streaming platform *actuvview* (www.actuvview.com).

The partnership with *actuvview*, which was launched in 2019 after a successful run as an accompanying service to the International Congress of Actuaries 2019, will further support



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From right to left: Lutz Wilhelmy (Treasurer AAE), Falco Valkenburg (Chairperson AAE), Martin Oymanns (Project Manager actuvview) sign the partner agreement in Brussels on 4 December 2019

the AAE member associations in ensuring that their members are highly qualified throughout their professional career – e.g. by providing easy accessible high-quality and up-to-date know-how – and will foster the cross-border transfer of knowledge and expertise in the actuarial community.

actuvview is the first streaming platform for actuaries operating worldwide and it provides constantly updated content on the whole range of actuarial topics and recordings from large international events such as the AAE's own European Congress of Actuaries 2019 in Lisbon in June last year, the Asian Actuarial Conference 2019 in Singapore in September or regular contributions from a constantly growing number of partners from industry and academia. actuvview offers its users a modern way and

easy-to-use platform to constantly expand their own knowledge.

Since 2020, all AAE member associations have had the possibility of making the actuvview platform and its content accessible to their members free of charge. The board of the AAE will accompany the partnership, which will initially last two years, with regular surveys to find out how modern services such as actuvview can best support the CPD strategies of the member associations and the CPD activities of individual actuaries on a permanent basis.

RECOMMENDATIONS FOR TALKS ON EUROPEAN ISSUES ON ACTUVIEW:

- **European Supervision in a Changing Environment, Gabriel Bernardino (EIOPA)**

Presentation from ECA 2019 in June 2019

- **The Actuary in the European Context, Esko Kivisaari (AAE)**
Presentation from the 100 year anniversary of the Czech Society of Actuaries in September 2019
- **Strategy and Governance of AAE, Thomas Béhar (AAE)**
Presentation from ECA 2019 in June 2019
- **Challenges in Educating Future Actuaries, Henning Wergen (AAE)**
Presentation from the 100 year anniversary of the Czech Society of Actuaries in September 2019

THE RETROCESSIONNAIRE

BY **ROMAIN DURAND**

In recent years the general public has come to know more about a somewhat ignored or neglected player of the insurance market, the reinsurer.

Historically, the reinsurer was always in the shadow of its partner, the insurer. For the general public, the insurer was (and is) seen as the ultimate risk carrier. However, in article after article the landscape of insurance has been revealed as more and more diverse with insurers sharing risk with the other player, the reinsurer. Munich Re, Swiss Re, Hannover Re, Scor Re or many others have greater image in the public eyes. Natural catastrophes and major events have propelled to the front pages of magazines these ‘insurers of insurers’. The public realised progressively that the final carrier of risk could in some cases be the reinsurer. This had the happy consequence for those of us involved in this activity to make it easier to answer to immigration officers about ‘what is reinsurance?’ or ‘is it legal?’ as it once happened to me.

But the chain of risk doesn’t stop with the reinsurer. It can be to some extent infinite. The reinsurer is not always the ultimate provider of covers and it could choose to cede part or all of its risks to another ‘risk’ company, a so called *retrocessionnaire*. In this case we are speaking of a third level of cession of the risk, from insured to insurer to reinsurer to *retrocessionnaire*.

The *retrocessionnaire* acts as a reinsurer to the reinsurer. It

could be a specialised player, only performing retrocessions, alternatively a reinsurer accepting risk of another reinsurer or a special vehicle, formed to cover a specific risk (SPV). The reasons to cede in the case of the reinsurer can easily be compared to the ones pushing the primary insurer to reinsure, such as mitigation of risk, search for capital relief, etc.

The *retrocessionnaire* is progressively attracting more attention. For several years, it played a strong role in entertaining a soft market, providing ultimate covers for risks in some lines at good prices. Now, it is ‘making its voice heard’ through increase of prices or tightening of terms and conditions.

This move should not be discarded and will have some influence on the ‘intermediary carriers’ of risks, such as insurers and reinsurers. In a recent memo KBW mentioned: ‘We expect January 1 reinsurance renewal pricing reviews to discuss rising retro rates that should drive higher catastrophe reinsurance pricing during upcoming April and June/July renewals.’ It shows the tight relation between pricing and *retrocessionnaire* in natural catastrophes covers.

As a first step, these price increases by retrocessionnaires put pressure on the margins of reinsurers and

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The higher covers, such as natural catastrophes, are a natural playing field for retrocessionnaires.

insurers. This is the consequence of this increase not transmitting instantly to the markets. It will have to transit through the adjustments of reinsurers and insurers before translating into restored margins for insurers and reinsurers. So in the shorter term the margins will decrease.

In a symmetrical move the 'soft' market created higher margins as the 'intermediary carriers' only transmitted to the market the improvements with some lags.

These phenomena can have widely different impacts on different lines of business or companies because retrocession does not always have the same importance or intensity. The higher covers, such as natural catastrophes, are a natural playing field for *retrocessionnaires*, but they also provide capacity for 'specialised' covers.

Retrocessionnaires, traditional or non-traditional, have been a good channel to convey abundance of money due to monetary policies to the market of insurance. It was a source of their increased influence. Is the extension of the chain of risk bearer good or bad for the market? It's difficult to say. On the positive side, one finds the increase of available capacity, not to be discarded in a world where 'protection gap' is huge and doesn't seem to be closed easily. On the negative, some think that

the presence of retrocessionnaire has possibly played a part in the smoothing of cycles, depriving the

market of the necessary alternative of hard and soft market rates.





WHO REALLY UNDERSTANDS EXPOSURE TO CYBER RISK?

BY **VISESH GOSRANI**

In this article I explain why insurers need to ensure that they have effectively assessed their exposure to cyber perils within their existing non-cyber policies, and how a framework developed by this Working Party can help them achieve this.

Cyber risk has potential to cause losses to many different lines of business due to the potential to cause damage to the property of the insured or third parties, business interruption to the insured or third parties and exposure to liability claims.

However, cyber risk is an evolving threat and our understanding of the potential ways in which cyber perils could cause losses also continues to evolve. This requires cyber exclusions to be continually developed, as deficiencies in exclusion wording or lack of

recognition that a cyber peril could be an issue, could result in unexpected or unintended losses on policies.

Some recent examples include the claims on Merck's Property policy as a result of their losses from NotPetya. The claim is still being pursued through the courts, where the outcome is likely to depend on whether the court decides that the claim can be denied on the basis of:

- NotPetya being judged to be a 'hostile and warlike action' (based on US responses,

attributing the cyber-attack to Russia),

- the 'warlike action' being directed against the Ukraine, and
- no use of the word 'indirect' in the war risks exclusion.

If the court rules that the exclusion does not apply, this will mean that the \$250m cyber sub-limit of Merck's property policy does not apply and the property policy is likely to experience a significant or total loss to its \$1.75bn insurance tower.

The concerns of regulatory authorities and market

commentators about lack of understanding of the potential for cyber perils to cause unforeseen losses to non-cyber policies have been well documented.

The key messages coming through are that insurers need to take the following actions:

- understand what their exposure to cyber perils might be
- clarify their policy coverage and wording, so they are covering what they intend
- clarify that pricing includes the losses resulting from cyber risk exposure
- enhance risk appetite to include non-affirmative cyber risk exposure.

The Cyber Risk Working Party has outlined a series of steps insurers can take to support their company reacting to the regulatory requirement to assess and manage aggregate exposure to cyber risk.

WHAT CAN YOU DO TO BETTER UNDERSTAND AND MANAGE YOUR COMPANY'S CYBER RISK EXPOSURE?

1. Assess your company's cyber risk exposures

One way to do this is to take a **framework** we developed that walks through the process of assessing your cyber risk exposures, the endorsements you have applied and the confidence you have in them.

If you haven't already started to assess your cyber risk exposures, the framework offers a starting point, with flexibility taking into account the materiality of the cyber

risk issue to your organisation and the amount of time you have to assess your exposure.

If you have already started to assess your cyber risk exposures, you can use the non-affirmative cyber assessment framework to review your current assessment and to highlight any areas you may have missed or treated differently.

2. Apply exclusions appropriately and update them where necessary

There has been considerable reliance in the market on long established clauses to exclude Cyber coverage and write back specific parts of the coverage. Given the significant developments in, and understanding of, cyber risk in recent years, you need to assess whether policy forms remain suitable and also analyse the perils to which the risk is exposed to assess whether these exclusions are appropriate.

Where clauses are applied inconsistently across lines of business, this may result in the need to perform a greater level of analysis to understand the impact of endorsements to policy wording.

3. Where you are not excluding a threat, price it in

Once you have established the cyber perils that you are exposed to, you need to decide whether to exclude or explicitly include them in the coverage of the policy. If you affirmatively include this exposure you need to use appropriate endorsements to manage the exposure with greater certainty.

4. Agree your cyber risk appetite

Agree which lines of business you

are prepared to include cyber risk exposure for and whether there are industries you wish to avoid exposure for. You should also agree your aggregate exposures to companies and groups across your different lines of coverage.

5. Be proportionate

The Cyber Risk Working Party recognises that cyber risk exposures will be significantly less material for some organisations than others. Therefore, we have provided a pyramid of approaches within the framework to assist in tailoring your approach to the appropriate level of materiality indicated in initial steps of the framework assessment.

Conclusion

Cyber risk is an important issue not only to insurers specifically covering cyber risks but to insurers more generally, where exclusions may or may not be suitable or valid. Insurers need to look hard at the coverage which they are applying and assess how cyber risk may affect their exposures.



VISESH GOSRANI is
Chair of the Institute and
Faculty of Actuaries Cyber
Risk Working Party.

IFRS 17: WHAT ARE THE IMPACTS ON LIFE INSURANCE?



BY **YOHAN BOTBOL**

Did you know that Luxembourg is the European leader in Unit-Linked products sold via the freedom of services? The main European insurance companies have set up an entity in Luxembourg to sell this product. These products leverage the proximity of the many investment funds in Luxembourg with almost \$5 trillion in assets, specific legislation for dedicated funds, and highly secured insurance companies. Companies that publish IFRS accounts will have to rethink almost everything.

The deadline for the entry into force of IFRS 17 is approaching, and Luxembourg companies having to align with this international accounting standard must face significant impacts beyond the accounting treatment. The standard will affect processes, IT systems, governance, results, and more.

Life insurance companies selling traditional life contracts such

as saving products or annuities provision accounts under the transitional IFRS 4 standard allowing the use of current accounting practices in local GAAP. The final IFRS 17 standard published on May 18, 2017 by the IASB will have to be adopted progressively by January 2022 with a comparative period in 2021. As such, the Luxembourg Life Insurance market mainly composed of Unit-Linked (UL)

contracts intended for savers looking for high return will have to adapt to the challenges imposed by the new standard.

What are the guiding principles of IFRS 17? How will the accounting of such contracts be impacted? What approaches should be adopted in order to comply with this standard?

THREE TYPE OF RESERVES, THREE ACCOUNTING MODELS, THREE LEVELS OF AGGREGATION

Three type of reserves

IFRS 17 imposes several guiding principles with impact on the closing processes:

Three types of reserve in the liability side of the insurance balance sheet:

IFRS 17 will impact the balance sheet of Insurance companies because they will have to consider two new concepts: a Risk Adjustment (RA) and a Contractual Services Margin (CSM) whose definitions are recalled in the tabel.

	THREE TYPES OF RESERVE
Premiums	Pre-coverage cash-flow (e.g. acquisition costs)
	Best Estimate
	Risk adjustment (RA)
	Contractual Service Margin (CSM)

- RA: Explicit margin representing the compensation the entity requires for bearing the non-financial risks;
- CSM refers to the unearned profits the entity will recognize as it provides services under the insurance contracts in the group

Note that no calculation method is specified in the standard for the RA. However, the cost of capital method could be applied with conditions following the same principle of the risk margin in the context of Solvency II.

With regards to the CSM, its recognition in the P&L must be made over the period of coverage:

- Based on the contracts' expected duration
- Based on the quantity of benefits provided under the contracts;

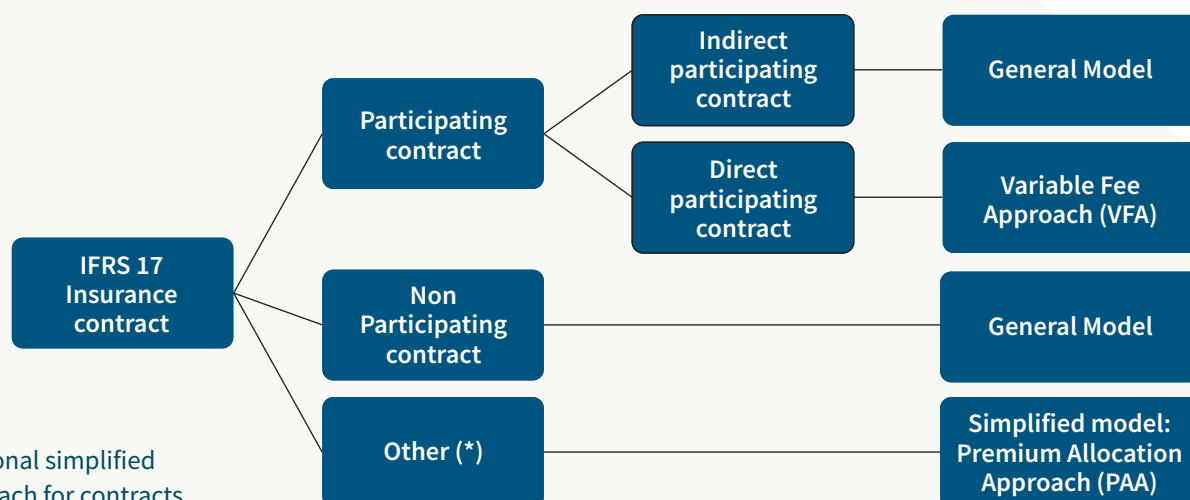
Allocation of the CSM must be applied on the basis of the CSM at the end of the period, i.e. after all adjustments that may affect the CSM during the period.

Three accounting models imposed by the International Accounting Standards Board (IASB)

In its guiding principles, IFRS 17 proposes three accounting models depending on the nature of the contracts. As such, insurance companies will

have to assess if contracts are 'participating contracts' or not, and if 'participating contracts' are with direct participation features or not.

All of this is required in order to choose the right accounting model to apply. The following graphic summarizes the classification:



*Optional simplified approach for contracts with a duration of one year or less, mainly for non-life contracts

Three levels of aggregation to define the unit measure level

Granularity is one of the major challenges of IFRS 17, in fact accounting under IFRS 17 will have to be done at the level of the unit of account based on the grouping by Portfolio by Profitability by Generation of the contracts considered (Mathematically: Portfolio X Profitability X Cohort) where:

- Portfolio is a set of insurance contracts which provide cover for similar risks and which are managed together;

- Profitability is split into three categories:
 - Onerous contract (CSM<0)
 - Contracts which bear a risk of becoming onerous during their lifetime (CSM>0)
 - Contracts which do not bear a risk of becoming onerous during their lifetime. (CSM>0)

- Generation or cohort is a group of contracts that are issued less than one year apart.

Once the unit of account has been defined at inception, no change is permitted during the coverage period.

WHAT ARE THE IMPACTS FOR UNIT-LINKED CONTRACTS AND WHAT APPROACHES SHOULD BE ADOPTED IN ORDER TO COMPLY WITH THIS STANDARD?

Unit-linked contracts are direct participating contracts because they include the following characteristics:

1. Insured persons are entitled to participate in a set of clearly identified underlying items;
2. The insurer expects to pay to the policyholder a substantial share of the returns on these underlying items;
3. The cash flows of policyholders are assumed to vary substantially with these underlying items.

Thus, UL contracts create an obligation for the insurer:

1. To pay to the policyholder the fair value of the underlying items;
2. Minorized by a variable amount remunerating the services provided by the insurer ('variable fees');
3. Minorized by any cash flow that does not vary with the underlying items.

The insurer's remuneration does not result much from the difference between premiums and benefits as from the insurer's right to be remunerated for its management of the savings entrusted.

Consequently, a consensus was found on the Life Insurance market, namely that UL contracts will be accounted for in VFA model. This accounting model is an alternative method to the general

model to take into account the specificities of direct participating contracts. For UL contracts, on first recognition, the valuation principles will be identical to those of the General Model, however in subsequent accounting periods, specific provisions apply to the CSM in the VFA model to reflect the specifics of participating contracts:

- All variations in future assumptions (with some exceptions) are offset in CSM as long as it remains positive;
- The CSM evolves according to variations of the 'variable fees' that the entity expects to obtain (loadings, financial margin);
- The financial result is nil because the financial income (IFRS 9) is offset by the interest charges on the liability side (IFRS 17). The result, therefore exclusively comes from the underwriting result.

In addition to the consequences of the application of the VFA accounting model, the definition of the unit of account will be structured for the measurement of the result due to the non-linearity of the CSM. Finally, significant operational impacts are expected:

- The unit of account requires the calculation of the Best Estimate by generation of contracts and embedding the new concept of profitability (impacts on IT and on cash flow projection models);
- The concept of 'fee' linked to contracts is new (impact on processes and tools

for determining the fee assumptions).

In conclusion, Life Insurance companies must be able to cope with all of the changes described and directly related to the IFRS 17 standard. This is in addition to other challenges that may emerge, which would for example be linked to the generation of 'multi-standard' accounts such as Local GAAP, IFRS and Solvency II balance sheets closing dates; and early or anticipated annual or quarterly closing methods.

LINKS

- <https://www.ilac.lu/>
- <https://www.aca.lu/en>
- <http://www.caa.lu/>

YOHAN BOTBOL is a fully qualified actuary from both the French and Luxembourgish Institute of Actuaries, and studied actuarial sciences in France and Canada. He also has a certificate in accounting from the University of Luxembourg and a Canadian Actuarial Bachelor. Yohan works at EY Luxembourg as Senior Manager of the actuarial and insurance advisory team. He is involved in the implementation of certain European Directives (i.e., Solvency 2, IDD and PRIIPS) as well as IFRS 17 implementation. He additionally works on IAS 19 and helps UK insurance companies to cope with Brexit and relocate to Luxembourg. Furthermore, Yohan is involved in the audit and internal audit of insurance and reinsurance companies.

THE INTERNATIONALIZATION OF THE ACTUARY

BY **SIMON CURETON**

With social media like Instagram, Facebook, Google and WhatsApp internationalization is increasing at a very fast pace. The world seems smaller than ever and there seem to be fewer and fewer boundaries to communicate to anyone, anytime, anywhere.

In line with these developments actuaries are increasingly working in an international fashion. In recent years we have had more and more actuaries working in the Netherlands coming from all over the globe, like from Eastern Europe, China, South Africa, the US and Canada. I myself was fortunate in coming to Holland from the UK at a young age too. And in my over 27 year career I have been fortunate to have worked with actuaries with different nationalities, backgrounds and cultures. Combining our different ways of solving problems is mutually reinforcing.





I therefore invite everyone to join me to look positively at the fascinating internationalized world that we are working in.

In my view, more than ever, the Royal Dutch Actuarial Association (Koninklijk Actuariel Genootschap) has great opportunities to reap the benefits of the rapid internationalization that is taking place. To be able to make use of each other's knowledge and skills, but also to be able to make use of each other's backgrounds and cultures. And also, to be able to learn from each other's different ways of thinking, working and communicating. I realize myself for instance that a 'direct' Dutch approach does not always work.

Internationalization of our profession can also be seen in our magazine De Actuaris: more and more articles are written in English and more and more articles are about sharing of international experiences. Furthermore our insurers are also becoming increasingly international. Some recent examples are Eli Global, Athora and LifeTri. Also, Dutch pension funds are starting to internationalize, like moving to Belgium.

This internationalization seems to be seen as a threat to some but to me this development leads to many opportunities. By thinking in opportunities instead of threats, as is the Dutch entrepreneurial way of thinking, and which has been very successful, we may find ways to help policyholders in the best way possible.

We have to be prepared for the future. Whether it is about international constructions and possibilities, different cultures, legislation or calculation methods: as an actuarial profession, we need to be ready.

I therefore invite everyone to join me to look positively at the fascinating internationalized world that we are working in. Moreover, to look positively at an even more internationalized future world that lies ahead of us. Be aware that joining the increasingly international world means progress. There are only opportunities for us as actuarial professionals!

DRS. SIMON CURETON

AAG CERA is Chief Actuary at Reinsurance Group of America, Incorporated, Amsterdam.

The author has written this blog in a personal capacity.



COLUMN

The European Commission's Directorate General for financial stability, financial services and capital markets union organised a conference to discuss the challenges and opportunities of the review of the **Solvency II directive** on 29 January in Brussels. The conference aimed to gather ideas on whether new risks or developments that insurers face or are going to face would require regulatory action.

Valdis Dombrovskis, Executive Vice-President of the European Commission as well as EIOPA Chair Gabriel Bernardino gave keynote speeches. Discussions were organised around four panels, covering the areas to be reviewed, and allowing further exchange on the future of the European insurance sector. As a background to the conference, the European Commission had already requested technical advice from EIOPA on the review and EIOPA is expected to deliver its final advice by the end of June 2020. Furthermore, the European Commission announced at the end of the conference that they also intend to launch a stakeholder consultation in March 2020 on the review.

I was delighted to have been invited as a speaker at this conference on the panel discussing long-termism of investments and long-term guarantee measures for insurance liabilities. The AAE intends to be at the forefront of the review of Solvency II and we recently commented on the EIOPA consultation on the opinion on the 2020 review of Solvency II. You can find our response [here](#).

The AAE will continue to be actively engaged with the key European institutions and stakeholders on this important dossier. If you are interested to participate and contribute to our work in this area, please contact me or our Solvency II project manager Siegbert Baldauf.

Cecilia Thorn
Chief Executive Actuarial Association of Europe

COLOPHON

The European Actuary (TEA) is the triannual magazine about international actuarial developments. TEA is written for European actuaries, financial specialists and board members. It will be released primarily as e-mail newsletter. The Editorial Board welcomes comments and reactions on this edition under info@theeuropeanactuary.org.

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NEXT ISSUE: SOLVENCY II

The next issue will appear 1 June 2020. Suggestions can be e-mailed to info@theeuropeanactuary.org. The deadline is 1 May 2020.

EUROPEAN AGENDA

Please check
<http://actuary.eu/event-calendar/>
for the most actual forthcoming events.

ADVERTISING IN THE EUROPEAN ACTUARY

The European Actuary (TEA) is sent as an online magazine to 25,000 actuaries and financial professionals throughout Europe. An advertisement in TEA, size 210 x 145 mm (half A4 and seen as full-screen), costs only 3,500 euros. Information on info@theeuropeanactuary.org