

# ACTUARY

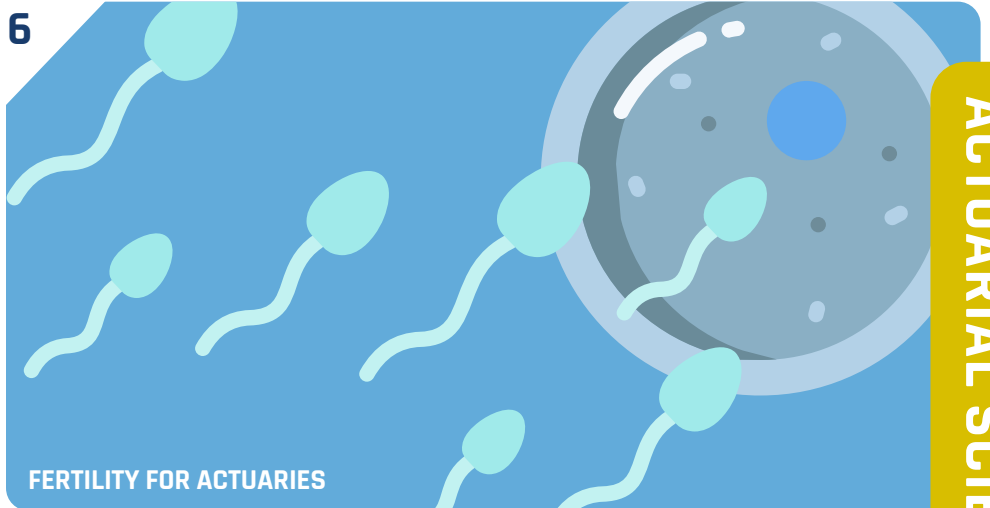
QUARTERLY MAGAZINE OF THE ACTUARIAL ASSOCIATION OF EUROPE

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AAE

ACTUARIAL ASSOCIATION OF EUROPE

ACTUARIAL SYNERGY:  
**HOW ACADEMIA  
AND INDUSTRY  
DRIVE INNOVATION TOGETHER**



KATRIEN ANTONIO

Prof. Katrien Antonio, professor in actuarial science and insurance analytics at KU Leuven and part-time professor in actuarial data science with the University of Amsterdam in the Netherlands whose research focuses on insurance data science joined Jennifer Baker to discuss developments in actuarial science, education and the profession overall.

*How do you experience the collaboration between academia and industry in actuarial science? What works well and where might there be room for improvement?*

That's a very interesting question, and one that is particularly relevant for the kind of work or research that I do. Working on actuarial data science, that has been a very important driver and a very important stimulus of some of my research contributions. Our collaborations with insurance >

**‘ Try to look over the hedge on both sides might be something we can all invest a bit more into.**

companies, or pension funds, allowed us or stimulated us to work on a question or challenge that they were confronted with in their daily activities. They were also able to give us access to work on their data and on the specific problems that they were facing. So that really was a driver for some of the recent contributions that we worked on – either in pricing or in reserving or in mortality modelling with data science tools, so I’m really grateful. For me, it’s very inspiring to work and be able to collaborate with insurance companies on their problems, using their data sets.

That was really great. Of course, it’s not easy to give external researchers access to data. It takes effort from actuaries working in these companies to make sure that they find a way to allow researchers to collaborate. So luckily enough, I know in my network, quite a few actors who are willing to make this effort. But I would like to call to anyone working in practice to reach out to academia or professors to share problems with us to stimulate interactions. Having more people who reach out and try to look over the hedge

on both sides – academia as well as industry – might be something we can all invest a bit more into.

***You mentioned reserving and pricing and I understand your work applies data science techniques to actuarial theory. Is practical applicability an important goal in your research?***

Let’s say the first, fundamental driver in our work is of course, to get the foundations right. So to get them technically right, to develop new ideas in a very solid way. And what I also find very important in my more recent work is to make our contributions reproducible, so that, for instance, actuaries in industry who want to learn from these research contributions can find the code, can find some simulated data that they can practise on or try out. So the theoretical foundations are key. Then it’s about illustrating, making it reproducible or showing what these models can do in different data sets, either simulated or real data to the best possible extent. Of course, with real data it is

shared within the boundaries of confidentiality agreements. So these are my main drivers.

Then of course, being stimulated by particular questions in industry is important, and that’s definitely a driver of the research. But I think there’s still a gap between the things that we develop and publish, and what one can use as tools in daily industry practice. I think there’s still a translation there to be made in making things more simple or more scalable. My main task as a researcher is to develop foundations and to make these reproducible. And then I hope that other people will take that last step in terms of making things simpler and translating the essentials for use in daily practice.

***Artificial intelligence, cybersecurity, quantum computing and climate research are all examples of trending fields of research. Are such research fields relevant to actuarial science? Do you consider actuarial science to be a trending research field? >***



## **‘ Luckily, I see many intelligent people trying to innovate and work on it. ’**

Again, that’s a very important question and a very challenging question to answer. Everything that has to do with data science tools, machine learning tools, and AI in a broader sense, are of course, things I try to follow closely to see how they can be used in actuarial research and be relevant for actuarial practice.

From a broader perspective if you look at these ‘grand challenges’ for instance, climate change, what we tried to do in recent work is to examine how we can use very granular weather data. How can we use that in life insurance mortality modelling? How can we use this for long life reserving or for pricing claims for covers where weather can have an impact. These are things that drive what we’re working on.

But of course there are so many challenges and I know other researchers that focus on cyber risk modelling. That’s a theme that has been developed. How inclusive is insurance is another theme. How to share risks between different agents in the insurance ecosystem, with a contribution from governments, to make sure that we are ready to bring the

best possible protection to people and companies in the best possible way. Luckily, I see many intelligent people trying to innovate and work on it.

***Turning now to Actuarial education: Is the Actuarial programme that you currently teach in Leuven different from when you started your Actuarial Studies? What have been the most important developments?***

It has definitely changed substantially over the last decade. But what is important to stress is that the technical foundations are still the same. We still teach generalised linear models (GLM), probability theory, etc. So all these historical cornerstones are still there. But of course we have to teach more now. We have to bring in more techniques and tools from the data science and the computer science world, but also look at sustainability, or evolutions in regulation, IFRS, Solvency and so on. So the toolkit has extended, but the technical foundations are still there. And we build on these technical foundations while trying to give our students this

larger scope on how to use their technical skills for good to contribute to society and to try to innovate with respect to these grand societal challenges.

***Why is it that so many highly-ranked Actuarial Science programmes worldwide are from Belgium? What can other countries learn from Belgium in terms of actuarial education?***

Well ranking programs is always a big discussion, but I don’t want to put too much weight on it, or say that our programs are better than any other great programs out there. But what I can say objectively is that Belgium has a very long standing tradition in Actuarial science. So we go back 80 years or so teaching actuarial science in universities in Belgium. We also have at least three universities teaching in French, in English and in Dutch. So we have three fully equipped two-year Master’s programs in Actuarial Science and we try to collaborate.

We know that we can’t be fully experts in all topics relevant to Actuarial Science, so we try to stimulate our students to look at what other actuarial programs in >

Belgium have to offer, and take elective courses there.

At European level we also have Erasmus exchanges and I think these are good evolutions.

So we do our best to keep up the tradition and I'm grateful for the universities, the boards and the government, that allow us to keep up these kinds of programs in a big university like ours.

### *How do you attract young people to become actuaries?*

I can only answer from my own experience. Here in Leuven, we try to maintain a good connection with the bachelor's program in mathematics, mathematical engineering, in economics, business, economics, business engineering, etc. And we try

to offer elective courses so that students early on in their program get a sense of what actuarial science or financial mathematics could look like. Then we just try to do our best as professors in this discipline to spark some interest in what one can do. If they're interested in business economics, or business engineering, finding the interplay between so many different, interesting technical subjects and disciplines is what eventually attracts students. But also trying to build technical things that can help people to offer protection so that they can achieve their dreams and their life goals. I also encourage them to [check out a video](#) made with the team here at the university.

### *Finally, what are the most important messages you want to give to your actuarial students?*

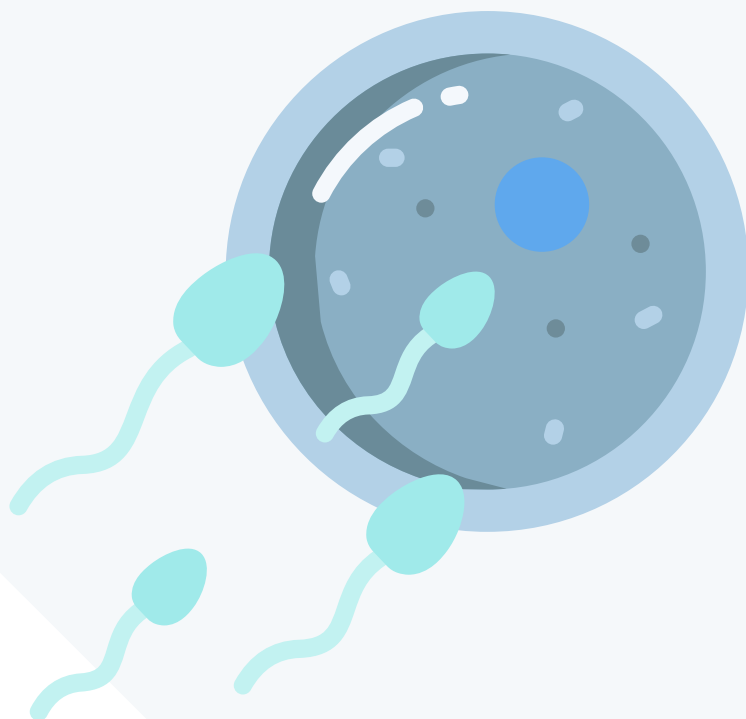
I think what I find important is that they take the time during their study to really work on their foundations. Because at that moment in their career they have the time to go deep into a subject, and I think that's still very, very important. So to take the time to really go into the depth of these foundations of profession. Then of course, it's important for them too, to get an overview of the different interesting disciplines that come together and the different challenges to which they can contribute in the next steps of their career. I guess that's the mix that I'll try to bring to my courses. Working on the technical foundations on one hand, but also trying to show them the bigger picture. <



STILL FROM [THE VIDEO](#)

# FERTILITY

## FOR ACTUARIES



BY **DERMOT GRENHAM**

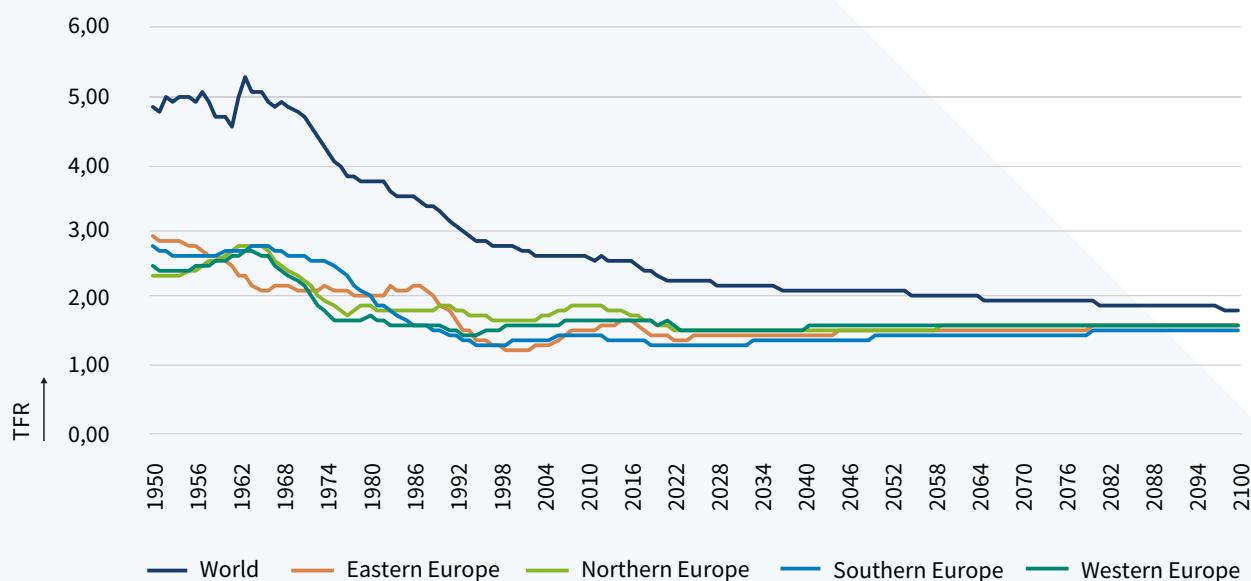
Changes in fertility rates, especially when combined with increasing longevity, are one of the mega trends that are expected to have a profound impact on global societies over the coming decades. I, along with international colleagues Yair Babad and Sam Gutterman, recently published a paper<sup>1</sup> introducing actuaries to the topic of fertility. The paper described how to analyse fertility rates demographically and considered the causes and consequences of changes in fertility. >

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<sup>1</sup> Babad, Y., Grenham, D., & Gutterman, S. (2023). Fertility and ageing – actuarial perspectives. *British Actuarial Journal*, 28, E6. doi:10.1017/S1357321723000065 Fertility and ageing – actuarial perspectives | *British Actuarial Journal* | Cambridge Core. Accessed 24 Sept. 2023.

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FIGURE 1: TOTAL FERTILITY RATES: EUROPEAN REGIONS AND THE WORLD



Source: United Nations, World Population Prospects 2024 medium variant (World Population Prospects - Population Division - United Nations) UNWPP2024

### DEMOGRAPHIC METRICS

In fertility analysis, the crude birth rate (CBR), the number of births per 1,000 population, plays a similar role to the crude death rate, the number of deaths per 1,000 population, in mortality analysis and suffers from similar drawbacks. The CBR is not just affected by changes in underlying fertility but also by changes in the age profile of the population. A better measure, although still not perfect, is the total fertility rate (TFR), which is the average number of live births a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates

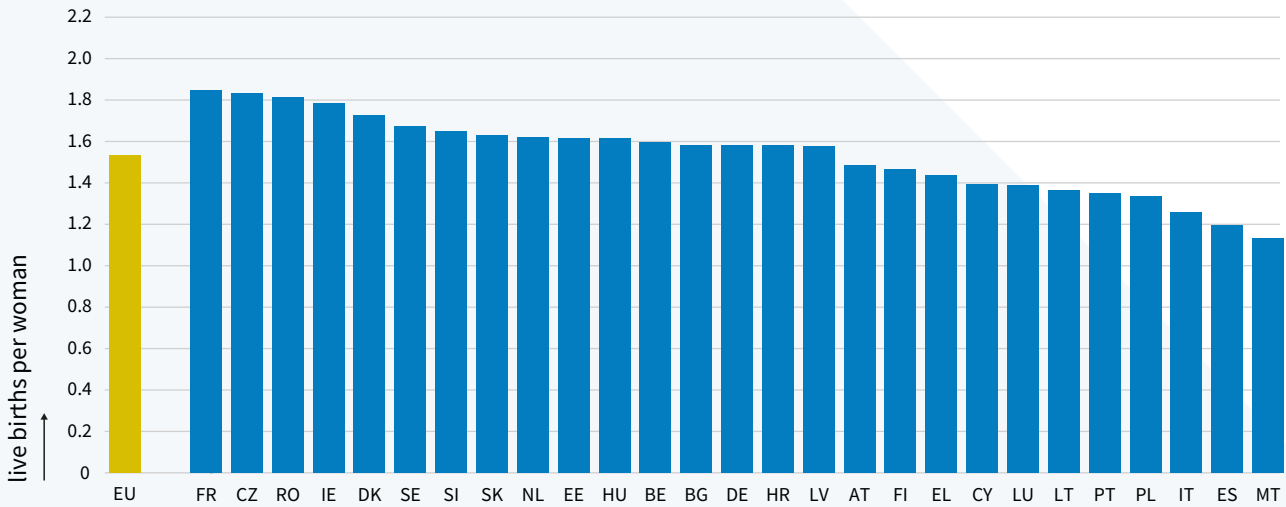
of a given period and if they were not subject to mortality. It is expressed as live births per woman. It is usually built up from fertility rates at single years of age or for 5-year age groups.

Figure 1 shows the UN's assumed TFRs, under its medium variant scenario, for different regions of Europe and, by way of comparison, for the World, from 1950 to the present and then projected for the rest of the century.

### WHAT'S HAPPENING WITH FERTILITY?

As the chart shows, fertility rates have been falling globally since the 1960s. In Europe fertility had fallen much earlier and has continued to fall. Fertility in all European countries is currently less than 2, below the so-called *replacement rate of fertility* of around 2.1. The replacement rate is that level of fertility at which a country, absent migration and with constant mortality rates, would, over time, maintain a stable population. European countries are not the only ones with below replacement fertility. In fact, over half of all countries are in this situation. >

FIGURE 2: FERTILITY RATE 2021 (NUMBER OF LIVE BIRTHS PER WOMAN)



Source: Eurostat (*Key Figures 2023 (europa.eu)*)

Explanations for why fertility has fallen to such a low, by historical standards, level can be provided at two levels, the how and the why. The greater availability and cultural acceptability of contraception and induced abortion are two of the causes along with postponement of marriage and an increase in childlessness among women. But these reasons explain more about how fertility has fallen than why. To explain why fertility has fallen, one needs to look at economic and sociological reasons. These include increases in the opportunity cost of having children and greater female education. This latter factor, as well as delaying union formation provides women with better career opportunities which delays the decision as to when to have children.

Cultural and religious attitudes and norms, including community and peer expectations, can have a significant impact on fertility rates. These factors are often related to the expected role of women in the family, community, and wider society. They include norms regarding the perceived optimum or minimum number of children that a couple may have. In spite of greater equality between men and women, it is still the women who take on more of the responsibility of rearing children, even if they are in employment.

According to the UN WPP2024: 'Individuals and couples face multiple obstacles to achieving their desired family size, including demands of higher education, high costs of childcare, challenges to work-family balance, unequal

division of household tasks between partners, care responsibilities for ageing parents and biological limits to the reproductive life span.'

Figure 2 shows the TFR by EU country. The UK's TFR in 2021 was 1.75.

### CONSEQUENCES OF LOW FERTILITY

In 1937 the economist John Maynard Keynes warned that *'...the chaining up of one devil [population growth] may, if we are careless, only serve to loose another [under employment due to low demand for goods, services and capital] still fiercer and more intractable.'*<sup>2</sup> >

<sup>2</sup> Keynes, J. M. 1937, *Some Economic Consequences of a Declining Population.*



There are a number of potential challenges arising from low fertility rates. One of the most obvious is that there will be an increase in the ratio of the number of older people to those of working age, however defined. There will be fewer working people contributing taxes to cover the costs of social security, healthcare and pensions. There may also be greater demands made upon those of working age to look after elderly relatives.

A smaller workforce could also lead to lower economic growth and increased inflation as companies will have to pay higher salaries to retain or recruit staff, something that was a cause of the recent spike in inflation experienced in many countries.

In response to the relative or absolute reduction in their working age population, some countries have responded by trying to increase the female participation rate, increasing state pension ages or by

allowing more immigration. Higher female participation rates can, ironically, exacerbate the problem by reducing fertility rates still further. Increased immigration can bring its own challenges. In addition to the cultural issues that it can pose, immigrants also age and therefore over time increase the size of the older population.

Other countries have introduced policies to try and reverse the long-term downward trends in their fertility rates. These include baby bonuses, reduced tax rates and employment guarantees. However, it is proving much harder to increase fertility rates than it was to reduce them. It is still not clear whether public policies are able to create increases in fertility rates that are stable and long term. Short term increases can arise when couples respond to incentives for having a baby by advancing the birth of their next child without increasing their ultimate family size.

## **THE ROLE OF ACTUARIES**

Actuaries working in the areas of social security and healthcare planning will already be working with fertility rates. However, as European populations are likely to continue to age, there will be more opportunities for actuaries to contribute their skills to help societies better understand the consequences of low and falling birth rates and to model the implications of different policy options. <

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### **DERMOT GRENHAM**

is leader of the IFOA Scottish Board and works as a non-executive director and risk manager at MDDUS, Scotland.

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# ECA 2024

## THE EUROPEAN COMMUNITY MEETING IN ROME

BY **MARTIN OYMANN**

The 5th European Congress of Actuaries (ECA 2024) was a landmark event held on June 6 and 7, 2024, at the Rome Marriott Park Hotel in Italy. Organized by the Actuarial Association of Europe (AAE) in collaboration with the Italian Society of Actuaries (ISOA), the congress brought together over 400 experts, decision makers, and professionals from more than 30 countries. The theme for this year's congress was 'Managing Uncertainty in a Changing World - Assessing Risks Sustainably for the Well-Being of Society', reflecting the pressing need for actuaries to address contemporary global challenges for the profession and industry.

PETRA HIELKEMA



**U**nder this theme, the comprehensive and engaging program combined plenary sessions and technical presentations in a parallel format to cover a broad spectrum of topics pertinent to the actuarial profession. For the plenary sessions, the AAE was particularly pleased to welcome well-known representatives from many important stakeholders of the European community – Petra Hielkema (EIOPA), Ronnie Garreud (CRO Forum) and Fabio Massimo Castaldo, MEP, held inspiring keynotes, Larisa Dragomir (DG FISMA), Charles Cowling (IAA) and Gemma Sanchez Danes (EFRAG) joined the discussion rounds as panelists. These sessions were particularly well-received and demonstrated the important role that actuaries play in many areas of the financial industry.

In addition, the biannual congress is always a good opportunity to not only address current topics to external stakeholders, but also to >



the community itself. Inga Helmane, current Chairperson of AAE, introduced the AAE's three-year strategic plan to the participating members of AAE's member associations.

ECA 2024 also offered numerous parallel sessions where the engaged experts presented on various actuarial topics. These sessions covered a wide range of areas, but primarily addressed pressing current topics related to developments in the areas of artificial intelligence, ESG and cyber risks.

The recordings of all sessions are now available on [the ECA 2024 event page on www.actuview.com](https://www.actuview.com).

For the participants, ECA 2024 was both an ideal opportunity for professional development and a platform for personal contacts and collaboration. And not only individual actuaries appreciated this aspect of the congress. The AAE is particularly pleased that next to the GOLD partner Swiss Re another 36 companies supported the event, which clearly underlines the importance of the profession for the whole industry. The central exhibition and break area facilitated interactions between delegates and exhibiting congress partners, also fostering a sense of community and shared purpose.

The highlight of the social program was the Italian evening event, which provided a delightful blend of cultural experiences and informal networking opportunities. Attendees enjoyed authentic Italian cuisine, entertainment, and the chance to build meaningful connections with colleagues from across Europe.

To conclude, ECA 2024 successfully brought together a vibrant community of actuaries to share knowledge, discuss innovations, and collaborate on solutions to contemporary challenges. The congress underscored the vital role of the actuarial profession in managing uncertainty and supporting sustainable development across various sectors. Participants left with a renewed sense of purpose and a deeper understanding of how they can contribute to a resilient and sustainable future according to a global approach.

For more details on the event, visit [the European Congress of Actuaries 2024 official website](https://www.actuview.com). Due to the success of this year's congress the AAE has already decided to start the process for preparing the ECA 2026. So, stay tuned for more. <

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**MARTIN OYMANNIS** is Event Project Lead,  
EAA - European Actuarial Academy and AAE ECA  
Steering Committee member.

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**FABIO MASSIMO  
CASTALDO**



# EMBRACING DIVERSITY: A STRATEGIC IMPERATIVE

## FOR THE FUTURE OF THE ACTUARIAL PROFESSION

BY **KIRSTEN SASADY**

In an era characterised by rapid technological advancements and global interconnectedness, the actuarial profession faces unprecedented challenges – and opportunities! As we navigate this complex landscape, one thing becomes increasingly clear: the solution is **not** to enhance individual competencies – instead we need to ensure the profession's continued relevance by embracing a broader array of perspectives. This article explores the multifaceted benefits of diversity in the actuarial field and why it is crucial for the profession's future.

KIRSTEN SASADY



### **BEYOND TRADITIONAL DIVERSITY INITIATIVES**

Historically, diversity initiatives have often focused narrowly on gender, age and ethnicity. While these are important dimensions, they represent only a fraction of the broader diversity spectrum. A more comprehensive approach to diversity includes considering different ways of thinking as well as diverse professional backgrounds. We must expand our view of differences and learn to see diversity in a broader perspective, recognising that each individual's unique perspective can contribute to a richer, more nuanced understanding of the world.

Moreover, traditional diversity initiatives often fall into the trap of trying to make those who are 'different' conform to existing norms, rather than allowing their unique perspectives to flourish. For diversity to truly be effective, organisations must not only recruit diverse talent but also create environments where these differences are celebrated and leveraged. This shift from mere representation to true inclusion is where the real power of diversity lies. >



## THE CHANGING LANDSCAPE OF THE ACTUARIAL PROFESSION

The future of the actuarial profession is marked by uncertainty and change. As businesses become more global and interconnected, the demand for actuarial teams to navigate diverse cultural, economic, and social landscapes has never been higher. Teams made up of similar members, who all have the traditional skill sets prized within the profession is no longer sufficient to meet these evolving demands. Instead, the actuarial profession must broaden its horizons, welcoming experts from fields such as for instance data science, economics, environmental science, and the social sciences.

A heterogeneous workforce can provide the actuarial profession with the agility it needs to continue to thrive. Integrating diverse disciplines not only enhances problem-solving capabilities but also enriches the actuarial toolset with innovative methodologies and varied analytical perspectives.

By embracing diversity, we open ourselves to a 360-degree view of the challenges and opportunities that lie ahead.

This broadened perspective is particularly important as the industry faces emerging challenges such as climate change, economic instability, and the rise of artificial intelligence. Actuaries who understand, can work within and can foster well-functioning diverse teams are much better equipped to develop innovative solutions to these complex problems. Diversity, therefore, becomes not just a benefit but a core component of strategic foresight and resilience.

## LEVERAGING SUPERFORECASTING IN ACTUARIAL SCIENCE

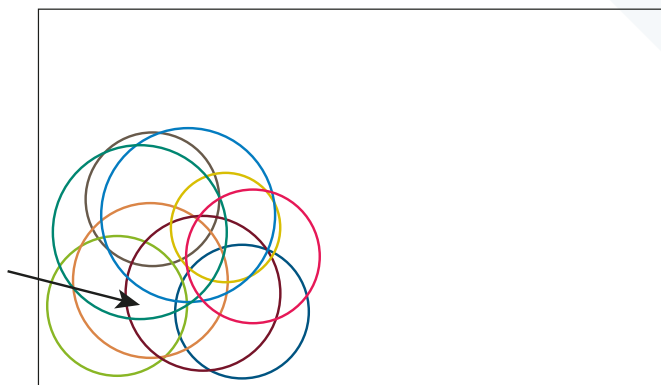
Infusing diverse perspectives enhances the profession's ability to cover more of the 'problem space,' leading to innovative solutions that would not emerge from homogeneous groups. Thinkers like Matthew Syed in *Rebel Ideas* and Philip E. Tetlock in *Superforecasting* have shown that teams composed of diverse

backgrounds consistently outperform more uniform counterparts.

Tetlock's research into forecasting reveals that diverse groups, which they term 'superforecasters', often achieve superior prediction accuracy through the aggregate of their varied perspectives. These superforecasters are not necessarily the most intelligent individuals but are characterised by their ability to integrate different types of information and their willingness to update their beliefs in response to new evidence.

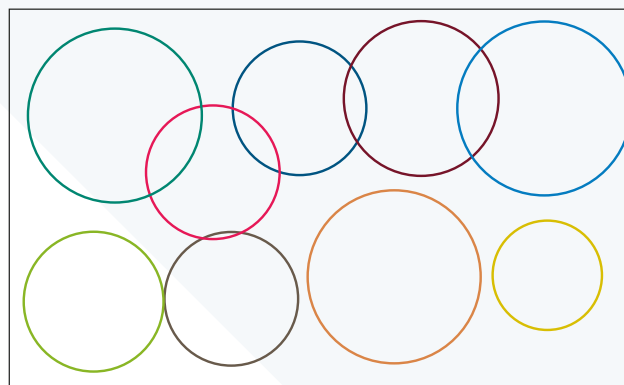
Matthew Syed describes it using the two illustrations below. We tend to surround ourselves with people who mirror our perspectives – it is comforting and makes us feel smarter. However it is far from optimal, when it comes to complex problem solving. The individuals in figure 2 are not more intelligent than those in figure 1, but they have 'coverage' qua their diversity and their collective intelligence is much higher. >

FIGURE 1



An unintelligent team (A team of clones)

FIGURE 2



An intelligent team (A team of rebels)



Embracing the superforecaster approach means fostering an environment where diverse opinions can be aired and reconciled. This approach not only improves the joint intelligence of the team but it also diminishes the risks associated with echo chambers, where similar viewpoints reinforce each other to the detriment of broader understanding and innovation.

### **CREATING A CULTURE OF INCLUSION WITH DIVERSITY LEADERSHIP**

Thus, to fully benefit from diversity, we must cultivate an environment where differences are not just tolerated but celebrated. It requires reshaping organisational cultures to foster collaboration across different disciplines and to move away from the traditional management practices that prioritise technical skills alone. This shift is to ensure that all voices are heard and valued, leading to richer insights and more robust decision-making.

Organisations must focus on developing leaders who can see the uniqueness in each employee and provide them with equal opportunities to succeed. Leaders, who actively work to dismantle silos and encourage interdisciplinary communication, thereby ensuring that diverse teams can function effectively and innovatively. Without proper leadership, diversity can lead to friction and conflict. It is essential to break down old systems and rebuild them in ways that remove barriers and promote inclusivity.

### **CONCLUSION**

The future of the actuarial profession hinges not on the intelligence of its members alone but on their ability to harness diverse perspectives and collaborate effectively. Diversity is not just a buzzword or a box to be checked. It is a strategic asset that can enhance the relevance and adaptability of the actuarial profession. We must evolve, not just by adding new skills to our repertoire but by fundamentally rethinking how we integrate and leverage diverse talents to tackle the multifaceted challenges of the 21st century. <

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**KIRSTEN SASADY** has extensive leadership experience and a proven track record of working in diverse actuarial roles across the profession and as a volunteer on committees within both the IAA and the AAE. She has now embarked on a mission to accelerate the movement towards a more inclusive and meaningful working life for everyone through diversity leadership and the value it brings from both a financial and a human perspective.

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# THE REAL 'EMILY IN PARIS'

BY **EMILY SCRIVENER**

You may have heard of the (in)famous 'Emily in Paris' Netflix series. An American lady, Emily, relocates to Paris to join a marketing firm, but initially faces unwelcoming locals, love triangles and other challenging stereotypes. Before I lose the French readership within this first paragraph, I should say my 'Emily in Paris' experience has been rather different!

**T**here are some parallels between Emily and I, notably our names and new country of residence. Beyond these though, the similarities fade away.

My move was pre-meditated, rather than having the stars align. I had been in London for most of my working life and adore the city. I'm incredibly grateful for the opportunities I was given there, socially and professionally. The hustle and bustle and strong insurance history make London a fantastic hub for actuaries.

This made it a very difficult decision to make, whether to leave London indefinitely. I built my career in London, the largest insurance hub in >

***'The hustle and bustle and strong insurance history make London a fantastic hub for actuaries.'***



**EMILY SCRIVENER** is head of Pricing at AXA XL, Paris.



Europe. Would I be afforded the same opportunities in France? I still have so much energy and ambition; would this move mean a plateau to my career?

But the time had come to move, driven by several personal factors. Therefore, I began to set the cogs in motion, beginning with my employer. I love my job, team, and AXA XL. I really wanted this move to benefit us both. So, I started the conversation early, initially with my manager and then with HR.

***‘Understanding the basics of social security, tax and retirement planning in the country should not be forgotten, nor underestimated.’***

I found myself in the very fortunate position that AXA XL was flexible to accommodate the move. This was made possible thanks to their passion to develop their employees. Indeed, employees have access to roles within AXA XL, globally, but also in all other AXA entities, with intra entity and intra company moves surprisingly common. As AXA XL has an entity in Paris with Pricing Actuaries, a local contract was created. There are other ways to do this, but a local contract was the right solution for me. Step one, tick!

The next step was the visa process... not as straight forward as I hoped! The key here is to gather all the relevant paperwork, to the required standards. For example, the UK often accepts original documents, whereas in France, they usually require a recent copy, which incurred costs and took time to retrieve from the UK government. But my application was accepted. Step two, tick!

I could then book a one-way ticket to Paris! However, once arriving in Paris, the to-do list continued.

Understanding the basics of social security, tax and retirement planning in the country should not be forgotten, nor underestimated. For example, what is their healthcare system, do you require insurance, can you transfer retirement funds to your new country of residence, >



are self-assessment tax returns required? This is an area I have particularly struggled with in France, despite receiving advice prior to the move. Their system is very different to what I am used to, therefore, feels very complex. I'm slowly understanding a bit more every time I use the healthcare system for example, but it hasn't been easy.

***'There are other ways to do this, but a local contract was the right solution for me.'***

Next, finding somewhere to live! I chose to look for privately rented accommodation but lacked the necessary paperwork. Landlords lacked flexibility when requesting my documentation (usually three months recent French payslips, latest French tax return, proof of previous rental payments). My company provided an employment contract and a letter including my tenure from the UK, but this often was not enough to appease the landlords. This is probably a reflection of the rental market in Paris at the time and made life difficult. However, one landlord accepted me, on the condition I have a guarantor. Fortunately, I had someone in France who could do this for me, but this may not be the case for everybody. There may be room to negotiate though, for example using rent insurance. It depends



on the country you're in and its laws, and the rental market.

Perhaps the most significant part of any move to a new country is the personal and social life. This is a big life event and can feel lonely, especially if you move alone. What I found most useful was leveraging my current network. There exists the idea 'six degrees of separation'. This suggests you are only six or fewer people away from knowing any other person. I have therefore made lots of friends of friends!

I have also met many successful and dynamic actuaries and had many interesting opportunities come my way, including presenting at a conference (in French!) and writing this article. This has contributed to realising that my trepidations about a career in Paris as an actuary were unfounded. I have found the actuarial industry in Paris welcoming and dynamic. Of course, I cannot comment about

the marketing industry, but I can say my integration has been simpler than Emily's!

So, whilst there might be a little less glamour, and a little less drama, this Emily in Paris is making the most of her life in the City of Lights.

***'This is probably a reflection of the rental market in Paris at the time and made life difficult.'***

I should mention this article contains my own opinions and not those of AXA XL, and ought not be considered advice. I muddled through my move with lots and lots of help. I recommend you consider your individual circumstances and do the relevant research if you are considering moving country. <



# MIND THE GAP

BY **MONIKA LIS** AND **MARCIN KRZYKOWSKI**

**UNDERSTANDING THE INSURANCE GAP.** The insurance gap is defined as the difference between the financial losses incurred from adverse events and the compensation received from insurance. A recent assessment by the Swiss Re Institute<sup>1</sup> estimated the insurance gap (excluding pensions) to be over \$1.83 trillion with an overall coverage percentage of 57.9%. Additionally, the Global Federation of Insurance Associations assessed annual global pension gap<sup>2</sup> of approximately \$1 trillion. Thus, the total unmet insurance needs globally amount to nearly \$3 trillion.

**T**he estimate of the insurance gap can vary depending on the data sources and methodologies used. Nonetheless, it is commonly presented on an annual basis, and it is important to use a consistent method that ideally does not depend on country-specific details. For instance, the Swiss Re Institute expresses the gap in terms of premium value, taking into account the additional costs associated with obtaining an adequate cover.

## CHALLENGES OF CONSISTENCY

The health insurance gap is a prime example of a problem where the biggest methodological advantage - simplicity - is also its biggest drawback. A common approach to estimating the health insurance gap is to base it on out-of-pocket health expenditures. The method is simple, consistent and does not require a deep understanding of the complexities of different healthcare systems.

The health insurance gap constitutes a half of an overall insurance gap (approximately \$1 trillion) with a global coverage of 77.7%. However, it does not necessarily mean that 77.7% of people have access to quality healthcare. It merely indicates access, but the quality and type of treatment can vary, perhaps significantly. >



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<sup>1</sup> Swiss Re Institute, sigma Resilience Index 2024.

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<sup>2</sup> GFIA, Global protection gaps and recommendations for bridging them, 2023.

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Working for the Polish Chamber of Insurers, we have developed a new way of assessing the insurance gap to provide a clearer message: the amount of money needed to approach the quality of the highest-ranked healthcare systems. We used the Principal Component Analysis (PCA) to illustrate the position of a healthcare system relative to others when certain adjustments are applied. This model involved creating an artificial country with specific level of the 20 most common variables, such as healthcare expenditure, number of doctors, life expectancy, mortality and morbidity due to cancer, and the proportion between an outpatient and hospital care.

For Poland, where this exercise was conducted,<sup>3</sup> the actual healthcare gap was found to be 5-6 times larger than the level assessed based on out-of-pocket expenses (PLN 22.1 bn vs. PLN 100-125 bn) assuming these funds are used appropriately.

Should we then multiply the global healthcare gap by 5 to get an accurate estimate? The answer is no, but to give the assessment actual meaning - that the money inserted to the system might impact quality - we might consider finding a local multiplier for a specific country or region.

### SYSTEMIC RISKS RECOGNITION

Understanding the insurance gap provides a valuable tool for the insurance industry and policymakers to systemically address the growing gap. It is particularly relevant for the pension gap, defined as the shortfall in funds needed to achieve a 70% replacement rate, as recommended by the Organisation for Economic Co-operation and Development (OECD).

European and Occupational Pension Authority (EIOPA) considers pension gap as a potential systemic risk. Petra Hielkema, the Chairperson of EIOPA, highlighted<sup>4</sup> that one in five senior citizens in the EU is at the risk of poverty or social exclusion, meaning more than 17 million people >



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<sup>3</sup> [Polska Izba Ubezpieczeń, Polacy i ryzyko – jak się ubezpieczamy? Luka ubezpieczeniowa w Polsce, 2024.](#)

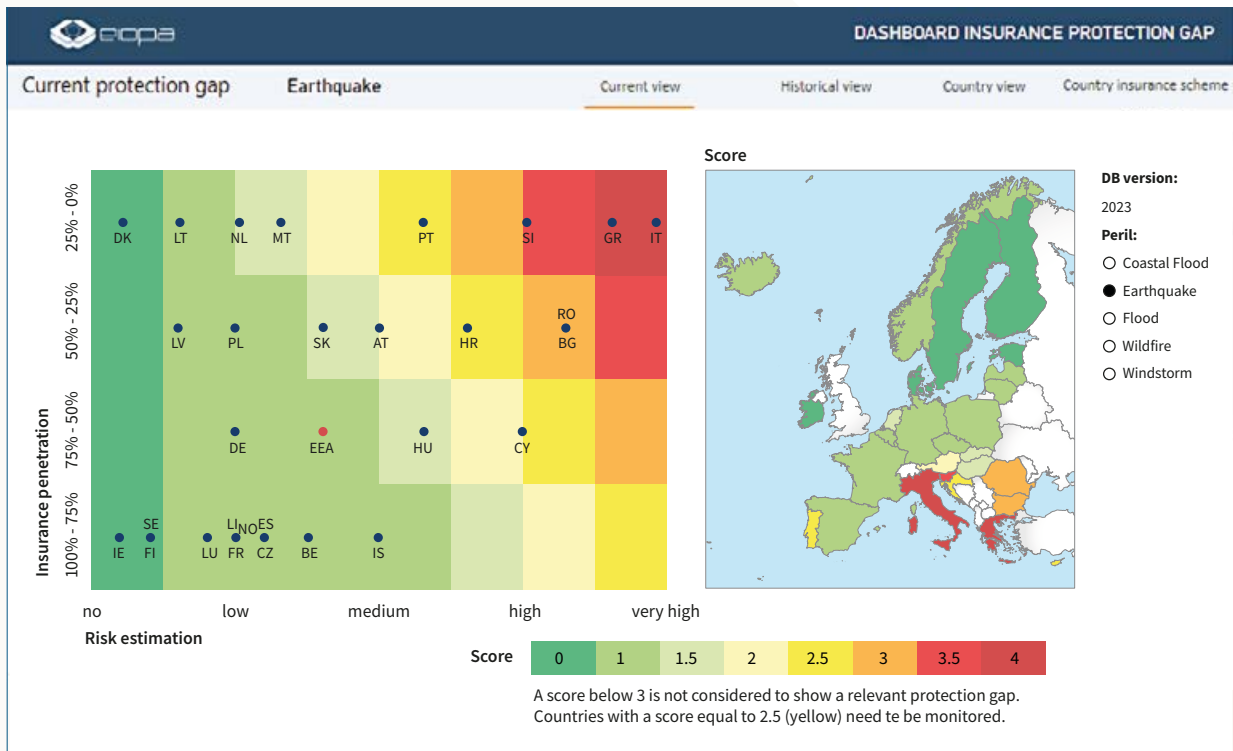
*(Polish Chamber of Insurers, Poles and Risk – How Do We Insure Ourselves? Insurance Gap in Poland, 2024)*

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<sup>4</sup> [Insurance and Pensions Supervision for a More Resilient Society, Speech delivered by Petra Hielkema at the CRO Forum in Venice, Italy, March 2024.](#)

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FIGURE 1. EIOPA, DASHBOARD INSURANCE PROTECTION GAP



Source: EIOPA

affected. The issue is specifically significant for women, who, on average receive 29% less in retirement than men in Europe. She stressed the importance of a pension tracking system at both the individual and European levels which would benefit both citizens and policymakers.

Such a tracking system is already developed by EIOPA for natural catastrophes, enabling more informed decision-making and planning (see Figure 1).<sup>5</sup>

### UNDERINSURANCE

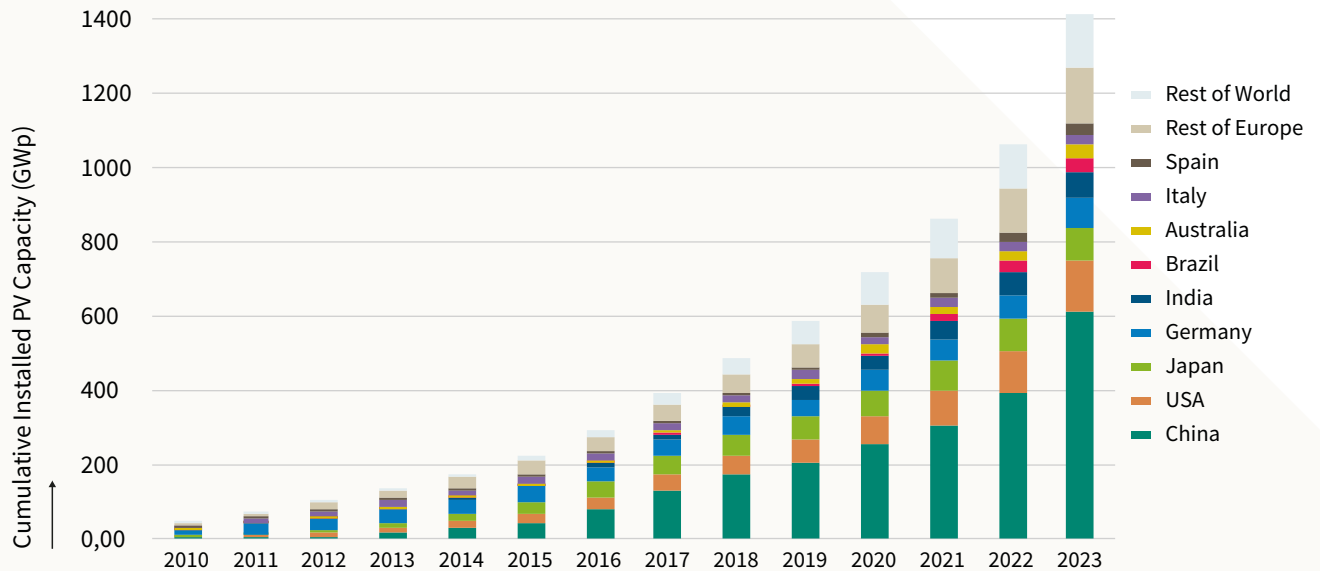
Looking at historical data, natural catastrophes resulted in insured losses of \$108 bn in 2023.<sup>6</sup> According to Swiss Re Institute, this marks the fourth consecutive year that insured

losses have surpassed \$100 bn, indicating a new norm. The long-term growth rate of these losses is expected to be between 5-7%, consistent with trends observed over the past 30 years. However, the overall economic losses reached \$280 bn, meaning that 62% of the global losses were uninsured. The Swiss Re Institute provides an example of the earthquake in Turkey and Syria, which claimed 58,000 lives and was the costliest event for the insurance industry in 2023, with losses amounting to \$6.2 bn. Despite this, only about 10% of all economic losses were covered. For context, global industrial losses ranging from \$1-5 bn are still considered medium severity. This is starkly contracted by the losses covered after Hurricane Ian which were exceeded \$60 bn in 2022. >

<sup>5</sup> EIOPA, Dashboard on insurance protection gap for natural catastrophes.

<sup>6</sup> Swiss Re Institute, sigma, Natural catastrophes in 2023.

**FIGURE 2: GLOBAL CUMULATIVE PV INSTALLATION BY REGION**



Source: IRENASTAT 2024

### DRAWBACKS OF RISK MODELLING

The impact of climate change and risk vulnerability is still under scrutiny by the industry, but the full extent might not yet be fully visible in the insurance gap projections due to its annual term view and in some areas limited data for comprehensive risk assessment.

As a specific risk booming in recent years is a photovoltaics (PV) roof installation which expanded the vulnerability to severe convective storms (SCS), specifically including hail. The annual production of PV modules has increased 10-fold over the past decade, with a compound annual growth of PV installations at 26% (see Figure 2).<sup>7</sup>

In 2023, SCS were responsible for more than \$60 bn losses and a series of SCS claims in Italy in July 2023 set a record in term of insured losses in the region, but there is still limited data for comprehensive SCS risk modelling.

### CONCLUSION

Understanding the insurance gap provides a valuable tool for the insurance industry and policymakers in discussions on potential systemic risks and how they might be mitigated. It helps them work towards creating efficient insurance, healthcare, and pension systems that can address the growing gap in an organized way. However, the selection of the appropriate methods and awareness of their limitations are crucial to an effective decision-making process. <

<sup>7</sup> International Renewable Energy Agency, IRENASTAT.

## CONTINUING OUR FOCUS

We currently seem to be experiencing a period of rapid and significant change, impacting all areas of our world, including climate, economic, technological and other changes. At a professional body level, the unexpected resignation of Giampaolo Crenca as Chairperson of the Actuarial Association of Europe (AAE) in May 2024 due to personal reasons was a notable change for the AAE.

When the AAE Board began implementing its Strategic Plan in 2023, it was evident that a long-term perspective would be crucial. Despite changes in the AAE's leadership team, our dedication and focus remain steadfast around delivering our Strategic Plan, which is built upon well-defined key pillars aligned with the AAE's vision and strategic objectives. These five pillars are:

- Development of the actuarial profession in traditional areas and wider fields
- Communication and stakeholder relationship management
- Lifelong learning and exchange of ideas
- Setting guidance and standards for the actuarial profession
- AAE operations and governance

The results achieved so far are impressive, given the AAE's volunteer-based environment (including AAE Committees and Board), supported by the AAE Secretariat and AAE project managers. Some of the AAE's accomplishments include strengthening relationships with EU stakeholders through regular meetings, exploring new areas for the actuarial profession such as Artificial Intelligence and Sustainability, and improving internal and external communication.

While we have many ideas for further progress, we must be mindful of the impact on workload and availability of resources. To achieve our goals, we will need to make organizational and process changes. Examples include:

- We are currently developing a proposal for a refined AAE Target Operating Model which will increase continuity in relationships with EU stakeholders, reinforce the AAE Secretariat, balance workloads and increase efficiency;
- We plan to restructure AAE Autumn and Spring meetings, combining virtual (pre-meeting) sessions and in-person sessions, to facilitate deeper networking and sharing of experiences and perspectives during in-person sessions.

The implementation of the AAE Strategic Plan requires dedication and effort. I am convinced that by working together, we can enhance relations with European institutions, promote professionalism and promote a European community of actuaries, in line with our vision statement:

*'The vision of the AAE is for actuaries throughout Europe to be recognised as the leading quantitative professional advisors in financial services, risk management and social protection, contributing to the well-being of society, and for European institutions to recognise the valuable role that the AAE plays as a leading source of advice on actuarial and related issues.'*

Inga Helmane

## COLOPHON

The European Actuary (TEA) is the quarterly 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 views and opinions expressed in TEA are those of the authors and do not necessarily reflect the official policy or position of the Editorial Board and/or the AAE. The Editorial Board welcomes comments and reactions on this edition under [info@theeuropeanactuary.org](mailto:info@theeuropeanactuary.org).

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### NEXT ISSUE

The next issue will appear 1 December 2024. Suggestions can be e-mailed to [info@theeuropeanactuary.org](mailto:info@theeuropeanactuary.org). The deadline is 1 November 2024.

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