actuarialREVIEW

VOL 52 / NO 3 / MAY-JUNE 2025

PUBLISHED BY THE **CASUALTY ACTUARIAL SOCIETY**

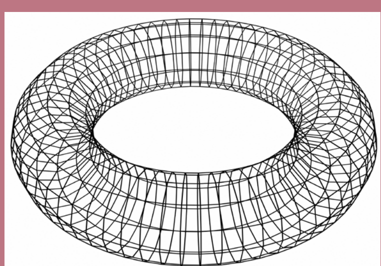
Commercial Auto and Workers' Comp:
The Neverending Story of Two Remarkable Lines

Regulating Fairness

Esther Tibbs, Actuary

actuarialREVIEW
May-June 2025

departments



on the cover

Actuarial Review (ISSN 10465081) is published bimonthly by the Casualty Actuarial Society, 4350 North Fairfax Drive, Suite 250, Arlington, VA 22203. Telephone: (703) 276-3100; Fax: (703) 276-3108; Email: ar@casact.org. Presorted standard postage is paid in Lutherville, MD. Publications Mail Agreement No. 40035891. Return Undeliverable Canadian Addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B 4R6.

The amount of dues applied toward each subscription of *Actuarial Review* is $10. Subscriptions to nonmembers are $50 per year. Postmaster: Send address changes to *Actuarial Review*, 4350 North Fairfax Drive, Suite 250, Arlington, Virginia 22203.

actuarialREVIEW
The magazine of the
Casualty Actuarial Society

editor'sNOTE By JIM WEISS

The Tortoise and the *AR*

Reality can regenerate in the blink of an eye or at the stroke of a pen. The year 2025 has already shown us that the Dow Jones can lose 5% of its value in a day, while ChatGPT can write a solid research report on any of the topics in *AR* in a fraction of the time it takes our volunteer authors and freelancers to pull one together. Sometimes it feels like the only things we can rely on to not change are the profits and losses that workers' comp and commercial auto yield year after year, respectively. Hence this month's cover story.

I did not use generative AI at all to write that story. Instead, I relied on Google searching, calling people I trust, reaching out to strangers whom I heard had very interesting viewpoints and throwing in a dash of my own experiences. The adventure took me 25 hours. Then I asked ChatGPT to write the article (including the same tortured metaphor), toying with different prompts for 15 minutes. If you care to see that exchange inclusive of the final article (and me futzing around with the export), here you go: https://chatgpt.com/share/67f17418-d428-8010-958d-b224e5f36233

Whose article is better? The two have ample (coincidental) similarities. Some of ChatGPT's themes such as regulation or interest rates did not come up a lot in my research, while others did, and I focused elsewhere out of preference (medical inflation) or deadline pressure (vehicle telematics). My article is much better (right?), but was it worth the 100 times longer it took me to write from scratch? Actuaries are grappling with questions such as this every day as we reevaluate our value proposition in light of generative AI.

ChatGPT can answer your questions, but it cannot walk a mile in your shoes. It cannot run seven continents or build a temple. It cannot start an insurance company that survives 203 years. It cannot comply with accounting or bias regulation. As far as we know, it cannot fix your commercial auto combined ratio. Neither can *AR*, but we will always aspire to be a vehicle for what your fellow actuaries think, feel and experience on these fronts. That is who we are, and we believe that from there, no limit exists to what we can accomplish together.

Actuarial Review welcomes story ideas from our readers. Please specify which department you intend for your item: Member News, Solve This, Professional Insight, Actuarial Expertise, etc.

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Follow the CAS

Strengthening the Foundation of the CAS with Clarity, Transparency and Resilience

A building's foundation is the bedrock upon which everything else rests. A robust foundation ensures structural integrity, safeguarding against cracks, shifts and even catastrophic collapse from forces like earthquakes or soil erosion. A well-constructed foundation can be the difference between a lasting legacy and a dangerous failure, ensuring the stability and safety of everything built above it.

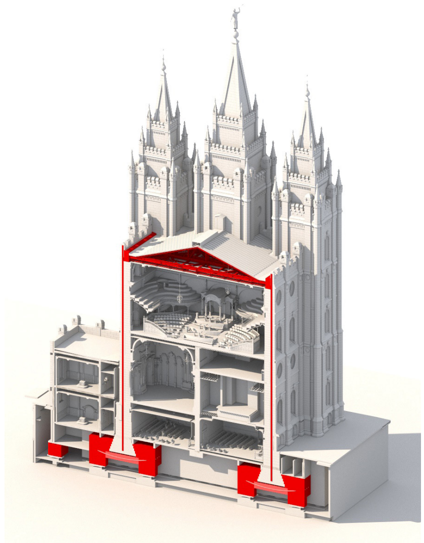
Over the past few years, I have been following a major foundation renovation of the Salt Lake Temple of the Church of Jesus Christ of Latter-day Saints. This massive and magnificent granite structure in the center of Salt Lake City, Utah, has stood for more than 130 years. Generations of my family (and many others) have sacred memories and significant milestones connected to this building. It was built in the late 1800s, using the best engineering technology and craftsmanship available at that time in that frontier community, with the intent that it would stand for hundreds of years.

That was long before there was any understanding of the earthquake risk in the Salt Lake Valley. In recent years, as that risk was studied and better understood, it became clear that in the event of a major earthquake, the temple would be severely damaged and would likely be beyond repair. So, engineers designed a major renovation of the foundation of the temple — strengthening and surrounding the original foundation with a modern earthquake-isolating foundation, while keeping the building in place. The building itself is also being strengthened, with new support structures directly connected to the larger, stronger and more resilient foundation. It's a remarkable feat of engineering that is nearing completion after five years of construction. When it is finished, the Salt Lake Temple will be much stronger and much more prepared to handle the forces of nature, and its legacy will be preserved for many generations to come.

On a much smaller and simpler scale, the CAS is also in the process of renovating our foundation, in a way that will benefit us and future generations of our profession. And we need your help to finish it.

As we announced on April 21, the CAS Board of Directors developed a new proposed Bylaws document; in August, we will be asking our members to vote to approve it. The new Bylaws document was created by merging our current CAS Constitution and CAS Bylaws into a single document, with only slight updates to modernize language and terminology. It retains all the key governing structures of the CAS — the President, the Board of Directors, the Executive Council, the Chief Staff Executive — exactly as described in the current Constitution and Bylaws. And it retains all the other direction, requirements and "rules of the road" contained in the current governing documents. In other words, the structure of the CAS will remain in place, while we significantly strengthen the foundation underneath.

So why are we asking our members to approve this new Bylaws proposal if nothing is significantly changing? In my mind, it comes down to three primary reasons — clarity, transparency and resilience.

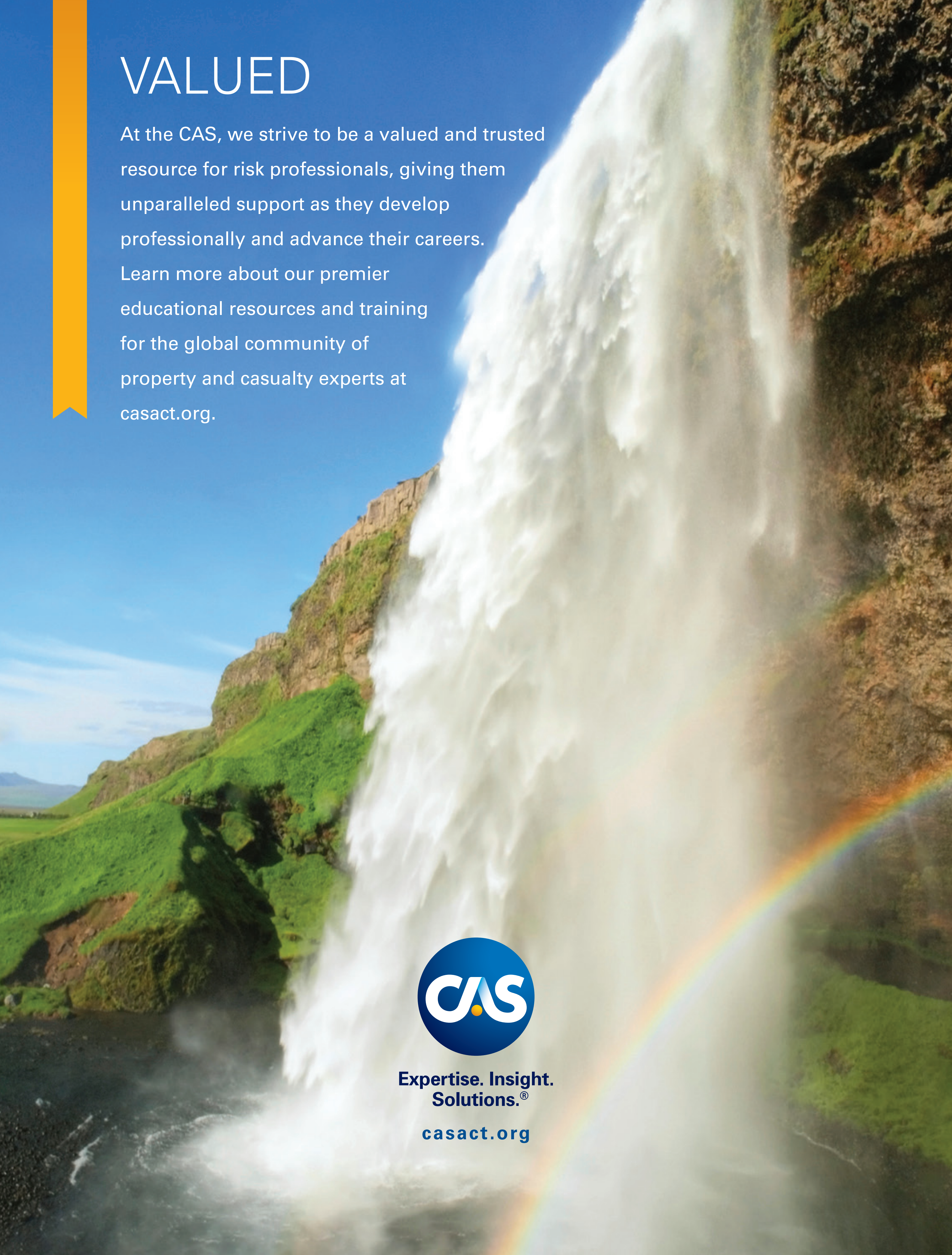


Clarity

Merging the CAS Constitution and CAS Bylaws into a single governing document will create clarity and transparency — removing overlap and duplication — and provide coherent guidance for the way the CAS is to be run.

Currently, these two documents have overlapping information and guidance. In many cases, you need to refer to both documents to have clarity about things like the role of the CAS Board, the President, the Executive Council

President's Message, page 8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At the CAS, we strive to be a valued and trusted resource for risk professionals, giving them unparalleled support as they develop professionally and advance their careers. Learn more about our premier educational resources and training for the global community of property and casualty experts at casact.org.
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President's Message

from page 6

and the Chief Staff Executive. Neither of the documents can stand on their own, which makes it overly complex for our members and our leaders to use these documents to understand the way the CAS is to be run. The clarity that will come from consolidating our governing documents will benefit all CAS members and leaders.

I encourage you to review the proposed Bylaws and the documents we have prepared to help you understand the changes. I hope you will see that we have worked hard to make these changes as clear as we can to you. And I expect you will also gain an understanding of the overlap and duplication that exists today — as well as the opportunity for increased clarity we have in front of us.

Transparency

The clear foundation of our proposed Bylaws will better support the transparency the Board strives for. As I shared in an earlier message, the Board has adopted principles of transparency that guide our communications with members regarding key decisions.

I'm excited to share a new way for members to see Board activities and understand CAS Governance. We recently launched a new "Governance and Board Resources" page on the CAS website. This page now provides a place for recent news from the Board and important information about how the Board operates. For example, we created a "Board 101" page that explains some of the fundamentals of the Board's role and functions.

We also created a new "CAS Governance Manual" that can be accessed from the Governance and Board Resources page. For the first time, we have published all of the key documents that guide us in how the CAS is run. It contains information about election procedures, role descriptions for leaders, charters for board committees, guidelines for budgeting and many other resources. This has already become a useful resource for me — providing consolidated references that help me in my role as president. I'm confident that this information can help you, too. If you ever have a question about how the CAS is run, you will likely find the answer here.

But if you still have a question or comment for the Board, you can pose a question directly through the Governance and Board Resources page. We have launched a new portal where you can submit your questions and receive official responses. You can even ask for your question to be posted for other members to read. This is another way that the Board is enhancing its longstanding commitment to member transparency and communication.

I look forward to strengthening the connections between this structure of transparency to a clearer foundational set of Bylaws, if approved by you, the members.

Resilience

Finally, I see the new Bylaws better enabling the resilience of the CAS for what may come ahead. The clarity and transparency I described above will certainly help our strategic initiatives stay connected to this foundation. This will help us to maintain the strategic focus needed to foster the future growth of the CAS in ways that align with the principles contained in our Bylaws.

This will help us to maintain the strategic focus needed to foster the future growth of the CAS in ways that align with the principles contained in our Bylaws.

There will come a time in the future when changes to the Bylaws will need to be made to respond the forces around us. When that time comes, it will be much more straightforward to make those changes if we can obtain membership approval to move to a single document now. The communication of proposed changes to the membership will also be improved and simplified, ensuring that our members understand the proposals in both wording and intent. As a result, future changes can be made when needed with informed support from you, the members.

The vote we have before us provides an opportunity to benefit our profession for years to come, by improving the clarity, transparency and resilience of the foundation of our professional association. I hope you will join with me in voting in August to approve these new Bylaws. In the meantime, please take the time to review the proposal, attend a town hall to learn more and ask the questions you may have.

COMINGS AND GOINGS

Tony Klemme, FCAS, has been named vice president of insurance services at WEA Member Benefits, a small P&C carrier serving public school employees of Wisconsin. Responsibilities include oversight of product, reinsurance, service and claims functions for this mission-driven organization.

Ryan Michel, FCAS, MAAA, has been named chief property and casualty officer at Grange Insurance Company. With more than 20 years of experience, Michel most recently served as president and chief underwriting officer at Trusted Resource Underwriters. Prior to that role, he spent over two decades at Allstate Insurance in several significant executive leadership positions, including serving as president of Allstate Business Insurance. Additionally, Michel spent 11 years in Canada as chief risk officer and then president and CEO of the Allstate Canada group of companies.

Chris Bilski, FCAS, MAAA, ARe, has been appointed senior vice president of underwriting at Topsail Re. In his new role, Bilski will oversee underwriting, marketing and account management. Bilski joins Topsail Re with extensive experience in reinsurance and actuarial roles. Prior to this appointment, he served as managing director at Howden Re from July 2023 to February 2025. Before that, he held the same title at IAT Insurance Group for more than five years. His background also includes nearly two decades at Munich Re, where he served in multiple underwriting and actuarial leadership positions.

Chris DiMartino, FCAS, CPCU, has been appointed chief underwriting officer at Orion180. DiMartino brings 27 years of experience in underwriting, actuarial science and product management in commercial and personal lines P&C insurance. Prior to joining Orion180, he served as senior vice president of insurance services at AAA Northeast and held prominent leadership roles in his 20+ years at The Hartford, most recently serving as head of product.

CALENDAR OF EVENTS

September 8–10, 2025
Casualty Loss Reserve
Seminar & Workshops
Philadelphia, PA

November 9–12, 2025
CAS Annual Meeting
Austin, TX

Visit casact.org for updates on meeting locations.

Ben Ng, FCAS, FSA, has been elected president of the Life Insurance Association of Malaysia (LIAM). Ng is the CEO of AIA Bhd. Ng brings over 30 years of experience, including 22 years abroad, demonstrating deep expertise in the life insurance industry. Since his appointment as CEO of AIA Bhd. in 2019, Ng has led AIA Malaysia's insurance, takaful, and private retirement scheme businesses, aligning with the company's mission to help Malaysians live healthier, longer and better lives. Under his leadership, AIA Malaysia has achieved growth across distribution channels, leveraging digital innovation, customer-centric solutions and data analytics.

EMAIL "COMINGS AND GOINGS" ITEMS TO AR@CASACT.ORG.

ACTUARIAL REVIEW *LETTERS POLICY*

Letters shall not contain personal attacks or statements directly or implicitly denigrating the characters of individuals or particular groups; false or unsubstantiated claims; or political rhetoric. Letters should be no more than 250 words and must include the author's name and phone number or email address, so the editorial staff can confirm the author. Anonymous letters will not be published. There shall be no recurrence of topics; issues previously addressed will not be the subject of continued letters to the editor, unless new and pertinent information is provided. No more than one letter from an individual can appear in every other issue. Letters should address content covered in AR. Content regarding the CAS Board of Directors or individual departmental policies should be directed to the appropriate staff and volunteer groups (e.g., board, working groups, committees, task forces or councils) instead of AR. No letter that attempts to use AR as a platform for an ulterior purpose will be published. Letters are subject to space limitations and are not guaranteed to be published. The AR editorial volunteer and staff team reserves the right to edit any submitted letter so that it conforms to this policy. Decisions to publish letters and make changes to submissions shall be made at the discretion of the AR Working Group and CAS staff.

For more information on AR editorial policies, visit https://ar.casact.org/wp-content/uploads/2023/06/AR_Statement_of_Purpose.pdf

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CAS STAFF SPOTLIGHT

Meet Kris Colvin, Instructional Designer

Kris Colvin

Welcome to the CAS Staff Spotlight, a column featuring members of the CAS staff. For this spotlight, we are proud to introduce you to Kris Colvin.

- **What do you do at the CAS? How does your role support the Strategic Plan?**
  I am the Professional Education Department's instructional designer and e-learning developer. My role is to collaborate with CAS members to develop e-learning content that supports the growth and development of actuarial science and property and casualty insurance through interactive e-learning content on various topics. The focus is on developing virtual learning opportunities that support the CAS's strategic mission.
- **What inspires you in your job? What do you love most about your job?**
  I am inspired by the opportunity to develop engaging learning content that supports our members' growth and development. I love the opportunity to work with new learning technology and grow in my understanding of developing exceptional e-learning content.
- **Describe your educational and professional background. What do you bring to the organization?**
  I have spent the last 23 years in the fields of learning and education. I hold a B.A. in history and an M.Ed. from Georgia Southern University. I also have a graduate certificate in instructional design and e-learning from the University of Georgia (Go Dawgs!), as well as an MBA in strategic management from Liberty University. Over the last 20+ years, I have taught in schools, led learning departments and developed training programs at every level imaginable. My leadership experiences include managing private schools and developing adult learning programs in Romania and Lithuania. I have taught every level from kindergarten through 12th grade advanced placement and from college undergraduate to professional adult learning. I bring an incredible wealth of experience and expertise about learning to the CAS.
- **What is your favorite hobby outside of work?**
  I have two favorite hobbies: Italian cooking and the study of history. My favorite period to study was world history from the turn of the 20th century through the end of the Cold War. However, I am developing an interest in Greek, Roman and overall Mediterranean history. My favorite dishes are shrimp scampi, Alfredo and bruschetta. I grow my own tomatoes and herbs to support my Italian cooking obsession.
- **If you could visit any place in the world, where would you go and why?**
  I would visit the Mediterranean. I love the region, the food, the culture, the climate and the history.
- **What would your colleagues find surprising about you?**
  My colleagues may find it surprising to know that I was born with a club foot that required several surgeries and corrective actions to overcome.


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MEMBER SPOTLIGHT

To Boldly Go

By JIM WEISS

Kiki Wang, FCAS, has been to places many people have never gone. Over the course of her career, she has worked in personal lines pricing at AIG, consulting at WTW, commercial lines underwriting at Chubb and excess and surplus (E&S) at Upland Capital Group. She also has a prolific volunteer track record with the CAS, bringing home an Above and Beyond Award in 2020 for her role on the Ratemaking, Product and Modeling (RPM) Committee. With all these feats, you wouldn't think Wang would have the energy to run a marathon, much less one on each continent. Yet that is exactly what she did, and I had the pleasure of catching up with her recently to talk about her experiences.

***AR:* True or false? Did you actually run seven marathons on seven continents?**

KW: True. Back around 2017, a friend told me about this marathon where you run through the Inca Trail, and you get to Machu Picchu at the end. It sounded really cool. At that time, I had never traveled internationally since coming to the U.S. There are always budget constraints and all that. I just never really thought of it but said to myself, "That sounds cool!"

***AR:* How did you go about training for the marathon?**

KW: To be honest, I was young and stupid. At the time I was a big hiker. I was really active and did some runs here and there and stayed fit. I thought I would be fine. I never really looked up what a marathon training plan is. A month or so prior to the race, I realized that this run would be high-altitude and very difficult, so I made last-ditch effort to schedule a trip to Colorado the weekend before and did a bunch of hiking and running, just trying to acclimate. Then I went.

***AR:* How did it go?**

KW: It was an amazing experience. It was really painful — definitely nothing easy. I wasn't a good runner. I'm still not. It was so hard, and I ran for almost the entire day. There were certain times I almost feared for my life, because there were giant rock stairs up and down the mountain. When you're going down, you have to pick up speed. I thought, "If I miss one step…." But it's something I've never experienced before, and it was so cool being out there essentially all by myself at times.

***AR:* When did you realize you wanted to run six more marathons?**

KW: When I finished in Machu Picchu and the sun was setting, I was one of the last people left before the last bus back into town. I thought, "Wow, I did it." It's probably the hardest thing I've ever done in my life, but I made it happen — partially out of pure will because I did not have a lot of physical ability. And Machu Picchu was just so meaningful. I suddenly realized I wanted to keep doing stuff like this — although obviously be a little more prepared! I happened to meet some of the other runners. A lot of them had something in common — they run a lot of marathons around the world and have this goal of doing seven marathons on seven continents. That planted the idea in my head. The first thing I did when I got back was sign up for the Antarctica marathon.

Kiki Wang, FCAS

***AR:* Tell me about Antarctica.**

KW: I flew to Argentina first, where they chartered a cruise for the runners from Ushuaia that took me to King George Island for the race. I went through other parts of Antarctica, and it almost felt like a tourist cruise. That was amazing. It gave me time and space to reflect and think. I purposely didn't buy the internet package. Every time I looked out of the window, it was just endless ocean or ice, or sometimes I saw penguins and other animals. All I heard was the ship and the environment outside. It was very healthy for me. I never really had time to reflect like that.

***AR:* Where else did you run besides Machu Picchu and Antarctica?**

KW: [In Asia,] I went up to the Everest base camp and then ran down. That one was not easy because I got altitude sickness before. At times I could barely eat and was coughing stuff up nonstop. Physically, it was terrible, but it was probably one of the most memorable races I've had. I was truly enjoying the environment and the people, sneaking out for drinks with them and things like that. Next, I ran the Queenstown marathon in New Zealand. That was technically [Oceania,] not Australia. I flew in three different planes, over 30 hours of economy class. I pretty much walked halfway because I couldn't run it all, but it was so beautiful there. I felt like I experienced all four seasons in one day — first it was sunny and beautiful, then snowy and then windy. [In Africa] I started at one of the gates from which people climb Kilimanjaro and ran down. Then I did the "Rock 'n' Roll" in Las Vegas on my birthday. The best part is the half-marathon where you run through the Vegas Strip, and for the rest they basically put you in a parking lot and ask you to run through all this stuff to make up the remaining distance. My most recent race was in Greece — the Athens marathon. We ran the original marathon route from the town Marathon to the iconic Panathenaic Stadium in Athens.

***AR:* You mentioned that you didn't prep much for the first race. Did that change later on?**

KW: I never aggressively planned events, but I always tried to learn something from the previous race. For example, [after Queenstown] I would make sure I got to the place a couple days in advance so that my legs were fresh. [After Everest,] I knew what medicine to take for altitude sickness — and probably not to go out and drink beforehand! Planning is a lot of work. I usually pick a date and start working backwards towards when I need to ramp up training: doing bigger backpacking trips, more trail running and monitoring my nutrition. The biggest thing of all: It's always about getting it booked. Then you just have to do it. If worse comes to worst you can cancel it, but that's a much bigger mental hurdle backing out once you have already signed up for it. And on the flip side, if you don't sign up, then you're not going to be able to do it.

***AR:* How did you balance the marathons with work?**

KW: I didn't train that hard. That's really what it was. I still put in training time, but I'm not an elite runner. I'm not even a good runner to this day. I'm not there trying to brag about my time or anything. Sometimes you're suffering during the race, but if you are taking an action there's a chance you can make it. You get it done because otherwise you just dream about it. Also, it turns out running is a good way to get work out of your head. Even sometimes when you do think about work, when you're running or doing stuff outside, you have the time and space to think about it. You're not really talking or complaining about it with others, so you can actually be shaping problems more logically in your head. But most of the time it's you just spacing out. And then, like half an hour later, I realize, "What was I thinking again?" That's usually a nice moment.

***AR:* Speaking of outside work, why did you start volunteering with CAS?**

KW: If you're within a company, you're confined in what your company does. You're in a little bubble, right? Or maybe a big bubble. But it's good to see outside of that bubble and have relationships with people that are not purely a work relationship. Here people are spending their time for free, purely for the reason that they want to move the profession a little further or feel like they can contribute to it or have a voice in it. Seeing people volunteering and getting to like it when I was younger, I kind of just started doing it. I really like planning conferences and webinars. I have my own ideas of what kind of topics will resonate, and I can help make them happen. That's pretty powerful in a way. You're shaping what industries need to listen to!

***AR:* Speaking of CAS, there is a rumor you threw candy at me at a conference.**

KW: Yes, I did. I still throw candies at people! I bring chocolates to work whenever I travel. You have to keep people engaged.

Zamstein Awarded the CAS 2025 Ratemaking Prize

Noa Zamstein, a senior data science researcher at Earnix in Israel, has won the CAS Ratemaking Prize for her paper, "Enhancing Actuarial Ratemaking with Synthetic Data for Privacy Preservation." Zamstein presented her paper at the Ratemaking, Product and Modeling Seminar held in Orlando, Florida, on March 10.

Zamstein explores the use of synthetic data to maintain privacy while preserving analytical integrity. She uses a synthetic generation approach based on kernel density estimation. Results demonstrate high fidelity in preserving statistical relationships while enhancing privacy protection. Zamstein concludes that synthetic data offers a viable solution to balancing privacy and utility in actuarial ratemaking. Data and model development can therefore be shared without exposing sensitive information.

This award is presented to the author of the best paper submitted to the Ratemaking Working Group's call for papers on technology and the ratemaking actuary. Papers are evaluated on originality of ideas, understandability of complex concepts, contribution to ratemaking literature, thoroughness of ideas expressed and timeliness and relevance of the research. This year's prize is $15,000.

Noa Zamstein

Peak Re-Sponsored 2024–2025 CAS ARECA Actuarial Case Competition Winners Announced

By BO LIN, CAS ASIA REGIONAL DIRECTOR

Peak Re, an Asia-based reinsurer, sponsored an Actuarial Case Competition organized by Asia Region Casualty Actuaries (ARECA), a CAS Regional Affiliate group. The competition aims to support and encourage university students in Asia who are interested in the general insurance actuarial field.

This year's competition focused on researching the impact of electric vehicles (EVs) on the auto industry. Over 40 teams from 21 universities across Malaysia, Singapore, Australia, Hong Kong, Mainland China, Indonesia, Nepal, Taiwan and Vietnam participated.

Five shortlisted teams had the opportunity to present their research to a distinguished panel of judges:

- Alvin Chan, FCAS, co-head of pricing, property & casualty, Peak Re.
- Chihang Wong, FCAS, co-head of pricing, property & casualty, Peak Re.
- Geoff Werner, FCAS, managing member, Werner Advisory LLC.
- Ron Kozlowski, FCAS, lead consultant, RTK Actuarial & CAS Asia Ambassador.
- Aw Yong Chor Leong, FCAS, head of actuarial, Lebuan Reinsurance Berhad and President of ARECA.

The top three winning teams were awarded cash prizes ranging from $600 to $1,800. Each winning team member also received a certificate of achievement and one free CAS exam registration.

Congratulations to all the participants and winners!

Winners' Testimonials

First place winners: Mooi Chun Yan (Alex), Ethan Lee Jia Hua and Chi Peiqi, Sunway University, Malaysia

"We are incredibly honored and grateful to have been named champions at the Peak Re-Sponsored CAS ARECA Case Competition 2024. We extend our heartfelt thanks to the organizers, sponsors and judges for creating this platform, as well as our mentors and peers who supported us along the way.

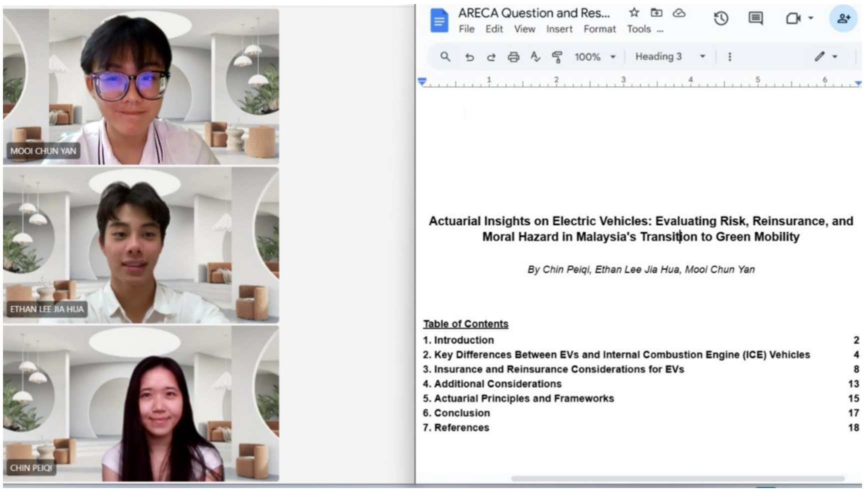
This competition pushed us to think critically, collaborate effectively and apply our knowledge to real-world challenges, just like working actuaries. Throughout the journey, we faced many hurdles, from identifying complex problems to crafting innovative solutions, but it was within these challenges where the invaluable learning lies.

This achievement is not just a milestone for our team but a testament to the power of persistence and teamwork. We hope to inspire others to embrace opportunities like this."

Second place winners: Darrell Lee Yu-Rong, Tan Yew Lu Keefe and Ng Wei Jun Eann, Nanyang Technology University, Singapore
"As a team of first-year students, participating in the Peak Re-Sponsored CAS ARECA Case Competition was a transformative experience. We stepped into the roles of both actuaries and consultants to analyze the impact of EVs on insurers and reinsurers. Learning from the many talented teams across Asia and gaining insights from seasoned judges was truly eye opening. This challenge not only honed our technical skills but also deepened our understanding of how emerging technologies are reshaping risk and sustainability, equipping us with a fresh perspective for the future."

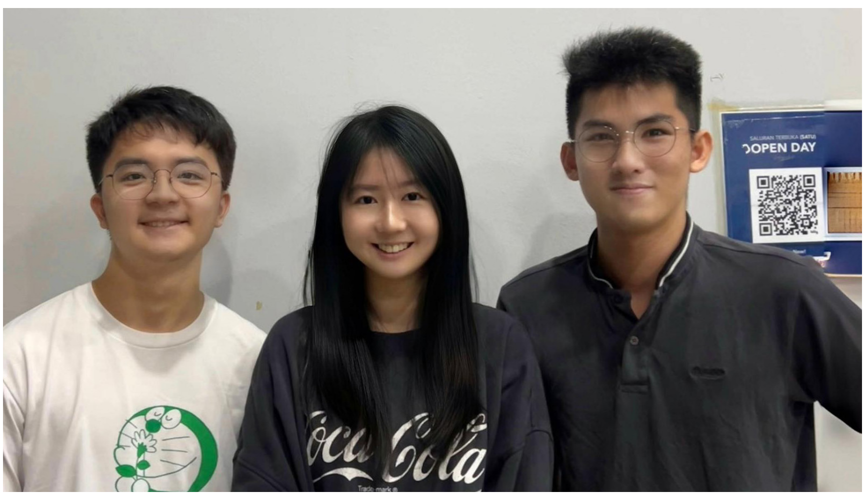
Third place winners: Kung Zhe Wei, Lim Xao Yang and Yau Zhi Yun, Universiti Malaya, Malaysia
"We are incredibly grateful for the opportunity to participate in this competition. It was an enriching experience that challenged us to think critically about the evolving landscape of the motor industry, particularly the impact of EVs. Through this journey, we gained valuable insights, collaborated as a team and learned from industry experts and fellow participants.

Achieving third place is an honor, and we truly appreciate the effort of the organizers, judges and everyone involved in making this event a success. This experience has further fueled our passion for research and problem solving, and we look forward to more opportunities like this in the future."



First place winners

Second place winners



Third place winners

Esther Tibbs, Actuary

By LIZ HAIGNEY LYNCH

In the 1930s, Esther Ophelia Tibbs made headlines with a fast-moving actuarial career, then faded from the limelight.

In May 1937, members of the National Negro Insurance Association gathered in Augusta, Georgia, for their 17th national convention. The opening festivities included performances by local choirs and an address from the city's white mayor; afterward, Black insurance professionals from across the U.S. weighed in on industry topics.

Especially noteworthy was the presence of three Black actuaries — "All there are in the world," according to executive Merah S. Stuart. The former president of the association was seriously impressed by these "three young people who have finished all there is to be finished in the field of accounting." Two of these rising stars were men: Asa T. Spaulding of North Carolina Mutual in Durham (a cousin and protégé of North Carolina Mutual chief C.C. Spaulding) and Antonio Maceo Walker of Universal Life in Memphis. And one was a woman: Esther Tibbs, representing the Afro-American Life Insurance Company of Jacksonville, Florida.

In 1937, Tibbs was thirty-one years old and at the top of her profession. She not only spoke at the Augusta convention but was elected association actuary, an officer position. Her career received frequent coverage in the Black press, particularly in Chicago, where she first made her mark at the Victory Life Insurance Company. When the association met the next year in Cleveland, Tibbs, Spaulding and Walker were all featured speakers.

But after this, their storylines diverge. Spaulding and Walker went on to distinguished careers, becoming heads of their respective companies and gaining fame for wide-ranging accomplishments. In 1939, Tibbs married a Washington, D.C., physician, moved to Georgetown and disappeared from insurance industry history.

This silence ends a striking chronicle of achievements by a young woman born in rural Iowa, raised in Ann Arbor and educated at the University of Michigan by a pioneering statistics professor. Tibbs was likely the U.S.'s first Black woman actuary and may have been its first Black actuary, period. Her career is an intriguing chapter in the story of the Black insurance industry of the 1920s and 1930s.

Esther in the University of Michigan yearbook, 1926. Digital image: Ancestry.com

Early life and education: From Buxton to Ann Arbor

Tibbs was born on May 24, 1906, in Buxton, Iowa, a then-thriving coal-mining community where a majority Black population lived in prosperous coexistence with white European immigrants. Her mother, Mary Ann ("Mollie"), taught music;

her father, Oscar, was a lawyer who later held part interest in a grocery store. Unfortunately, he struggled as a grocer. The partnership dissolved, as did the Tibbs' marriage, when Esther was still a toddler.

Mollie Tibbs returned to her hometown of Ann Arbor, Michigan, and Tibbs grew up mostly in the household of her maternal grandmother, Esther Dickson, a laundress. At Ann Arbor High School young Esther made the honors list and graduated in the spring of 1923, then headed straight into a summer program at the University of Michigan.

Even at this early stage, the Black press was taking note. In August 1923, the Chicago Defender hailed 17-year-old Tibbs' entrance into the paper's Bud Billiken youth club. "Even though she has not been a member of the club very long, we can frankly say that she is 100 per cent," the writer enthused. "Esther is now attending the University of Michigan summer school. Isn't that nice?"

Tibbs earned her Bachelor of Science degree from Michigan in June 1926, with most of her coursework in mathematics, according to university records. From later developments in Esther's career, it's also apparent that her abilities caught the attention of Harry C. Carver (1890–1977), a pioneer in developing mathematical statistics as an academic discipline.

As a brilliant young Michigan graduate, Carver was recruited by his alma mater in 1916 to beef up the university's new actuarial science program with probability and statistics courses. Eventually he founded *The Annals of Mathematical Statistics* to publish papers from the fledgling field of statistical analysis.

Esther Tibbs, aged about seven. Family collection; courtesy Armstrong Marshall.

When Tibbs studied at Michigan, Carver was still an associate professor. (He would become a full professor in 1936.) He was gifted, warmhearted and eccentric, a teetotaler who lived on milk and crackers. And in the words of a colleague, he was "a truly inspiring teacher who transmitted his enthusiasm for his subject to his students."

As Tibbs described it several years later, choosing to become an actuary was almost inevitable:

> *When making up my schedule of classes [in] the second part of my sophomore year at the University of Michigan, a friend, Sarah Pelham, was glancing through the catalog. She started laughing and said, "Why, Esther, I do not see what more mathematics you can take except that in actuarial science. Why not add a little economics to your program and become an actuary?"*
>
> *I replied: "What is an actuary?" She answered: "I do not know, except that it is something that no Negro is." Therefore, I started actuarial mathematics and became subsequently an actuary.*

Tibbs went to work for the Liberty Life Insurance Company in Chicago after completing her bachelor's degree, although newspaper sources don't specify her responsibilities there. Social news items also chronicle more festive times in fall 1927 — socializing at dances and motoring to Urbana to catch the Illinois-Michigan football game.

Amid the fun, Tibbs retained a yearning for learning. Census data indicates that she had a year of postgraduate level education, and according to news accounts, she returned to the University of Michigan for further study in mathematics, earning a master of science in 1929. Soon afterward, her insurance career really took off.

Triumphs at Victory Life Insurance

"Stenographer, Insurance" is the occupation listed for Esther O. Tibbs, single, age 23, in the federal census of April 1930 for Chicago. She would not remain single or a stenographer much longer. That September in Ann Arbor, she married lawyer Theophilus M. Mann, a native of Springfield, Illinois. Soon after, a group of Chicago election commissioners congratulated the newlyweds at their Prairie Avenue home and presented them with an end table. As the Chicago Defender noted, the Manns were a couple on the rise.

> *Mrs. Mann, formerly Miss Esther Tibbs, is a graduate of the University of Michigan and is an actuary with the Victory Life Insurance company. Attorney Mann, graduate of the University of Illinois, holds an important position in the office of the recorder of deeds.*

At Victory Life, Tibbs-Mann joined a business empire built by Louisiana-born Anthony Overton, "widely regarded as one of the twentieth century's most significant African American entrepreneurs," writes his biographer Robert E. Weems Jr. In Kansas City, Overton founded the Overton Hygienic Manufacturing Company, a major producer of beauty products for Black women. He came to Chicago as the Great Migration era dawned, expanding into magazine and newspaper publishing. In the 1920s, he added the presidency of the Douglass National Bank to his portfolio, then the Victory Life Insurance Company, organized in 1924.

Overton brimmed with drive, charisma and (to his critics) ruthlessness. He was also unusually open to hiring women for key positions in his companies, Weems observes. One example was Esther's friend Olive Diggs, eventually the editor of Overton's Chicago Bee newspaper. Visiting Chicago a decade after moving away, Esther "[dropped] by the Bee to say 'hi' to Olive M. Diggs, long-time friend of Douglass National Bank-Victory Life insurance days."

Victory Life proved a good fit for a talented woman with a statistics background. In March 1931, the Baltimore Afro-American declared that "Victory Life is Now Million Dollar Co." and listed Mrs. Esther Tibbs-Mann, actuary, among the company's officers. Also that year, Tibbs-Mann was inducted into the American Statistical Association as "the first Race person ever elected to membership," the Chicago Defender reported. Her sponsor was Harry C. Carver, now head of the statistical mathematics department at the University of Michigan.

Esther Tibbs, class of 1923, Ann Arbor High School yearbook. Digital image: Ancestry.com

In early 1932, the Defender published an admiring profile of Tibbs-Mann, praising her admission to the American Statistical Association. It tacked on a helpful explanation of her profession: "… an official in a life insurance company who evaluates life insurance premiums, benefits and risks." And *Who's Who In Insurance*'s 1932 edition named Tibbs-Mann as company actuary in a list of Victory Life's officers. At this point, her actuarial colleagues Asa T. Spaulding and A. Maceo Walker had yet to appear in the directory. (Spaulding joined North Carolina Mutual in January 1933, according to Weems' study *Black Business In The New South*, while a biographical sketch of Walker says he joined the board at Universal after earning his master's in actuarial science from Michigan in 1935.)

Navigating storms

In the background simmered the deepening Great Depression, to which not even a tycoon of Anthony Overton's caliber was immune. Among the problems besetting Overton after the Crash of '29 were dwindling deposits in his Douglass National Bank, along with heavy investments in a real estate market whose bubble had burst with a vengeance.

Soon the spotlight also fell on iffy finances at Victory Life. As Weems details, Overton faced scrutiny by regulators in three states, not to mention increasingly contentious Victory Life board members, two of whom launched an in-depth investigation of the company. Overton countered by summoning a board meeting to oust the whistleblowers, but a circuit court judge slapped down an injunction forbidding any interference.

The bombshell findings hit the headlines in March 1932. The Chicago Defender bluntly accused Overton of milking Victory Life for the benefit of himself and his family, while the internal probe turned up numerous examples of Victory's income being funneled into Overton's other endeavors. Even worse was the use of Victory Life cash to prop up Douglass National Bank through stock purchases and a loan to salvage a failed Douglass real estate deal.

Overton's reputation was dealt a crippling blow. As calls mounted for his removal as Victory's president, he successfully petitioned for a court-appointed receiver to take over the company's administration. The judge named a white official, a bitter pill for observers in the Black business community. When the receiver presented his findings to stockholders in December 1932, at least one reporter caught a whiff of condescension: "The receiver attempted to pat the colored folks on the back and stated he never would have done for a white company what he was doing for this colored company."

Assisting the receiver was Tibbs-Mann, a close-up witness to Victory Life's painful deterioration. After Overton's attempt to oust his board opponents, she was named Victory's temporary administrator, and in May 1932, was elected an assistant secretary. She might have been gratified when the receiver praised the work of Victory's office staff, but then again, perhaps not. "[He] said they were the peer of any businesswomen in America," ran a sharp-tongued description in the Pittsburgh Courier. "This was undoubtedly true, and, according to the opinion of one of those in authority, was about the only true thing he said."

In the spring of 1933, Victory Life was reorganized as Victory Mutual Life. Anthony Overton was officially out as president, and a revamped leadership managed to steady the rocking boat. But by this time, Tibbs-Mann had other storms to weather. She filed for divorce from Theophilus Mann in October 1933, which set off a spate of gossipy coverage. The Defender ran his-and-her portraits captioned "Sues Hubby" and "Sued by Wife." The Pittsburgh Courier quipped it was a matter of "give me liberty or give me love" — a reference to a current jazzy hit song.


THE BLACK DISPATCH, OKLAHOMA CITY, OKLA., JAN. 24, 1929

Page Seven

NEW GOVERNOR OF MISSOURI ENTERS OFFICE TO AID NEGRO DEVELOPMENT

PROBABLE THAT LINCOLN UNIVERSITY WILL GET SLICE OF EXECUTIVE'S PIE

Home for Feeble-minded, Boys Reformatory and State Penitentiary Come in For Discussion

(By R. C. FISHER, Staff Correspondent, A. N. P.)

Tenor To Study Under Burleigh

"Just Can't Make My Voice Behave"

"JAZZ OPERA" HAS ITS PREMIER

NELL HUNTER SAILS FOR EUROPE

January 17-23—Insurance Week of National Thrift Month

Don't Let Old Age Find You Poor and Needy

LIFE INSURANCE is not an expense. Every Premium payment is Money laid aside for future use—for yourself or for those you love. When Old Age comes, you may use the Money thus set aside to enjoy the comforts provided by years of Regular Investment in Insurance protection. Don't trust your future to luck.

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PYRAMID LIFE INS. CO. Chicago, Illinois
SECURITY LIFE INS. CO. Muskogee, Oklahoma
SOUTHERN AID SOCIETY of VA. Richmond, Virginia
UNITY INDUSTRIAL LIFE INS. CO. New Orleans, Louisiana
UNDERWRITERS MUTUAL LIFE INS. CO. Chicago, Illinois
VICTORY LIFE INS. CO. Chicago, Illinois

Members of THE NATIONAL NEGRO INSURANCE ASSOCIATION

..to do ALL THINGS WELL— as a pencil and five cent note book will prove

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"SERVICE WITH A SMILE"

SEGREGATION SUPPORTERS OF CHICAGO WOULD HAVE NEGROES MOVE

N. A. A. C. P. INVESTIGATOR ATTENDS CHICAGO SEGREGATION MEETING

To Retain Homestead, White Wife and Colored Husband Must Separate

Garvey Plans Daily Paper and Convention

MAN DIES AT 109 YEARS

COHEN SEEKS REAPPOINTMENT

Contract Awarded For Arkansas Schools

New York Police Surgeon Given Banquet

Image of a newspaper page containing an ad for National Negro Insurance Association member companies, including Victory Life, 1929. Digital image: Newspapers.com

Tibbs continued at Victory Mutual until 1936, when she left to become an actuary with the Afro-American Life Insurance Company in Jacksonville, Florida. She was joining another noteworthy Black insurance enterprise, founded in 1901 and expanding to include branch offices in Orlando, Daytona, Tallahassee and Atlanta. Despite the Depression's ravages, Afro-American Life's leadership had "piloted the ship safely into the harbor" with an annual income of nearly a million dollars and reserves of over half a million, according to a company history.

In Florida, Tibbs' professional energy continued strong. She headed to those bustling conventions of the National Negro Insurance Association in 1937 and 1938, joining rosters of speakers discussing "every phase of the insurance business from the viewpoint of executive and policyholder." She also researched industry-wide trends for Black insurers during the run-up to the Crash. Her analysis of annual statements from National Negro Insurance Association member firms was cited in a 1939 Howard University study examining factors leading to the collapse of the Washington, D.C.-based National Benefit Life Insurance Company. National Benefit fell in 1931, weakened by a poorly timed merger and overextension into real estate investments on the eve of the Depression — problems that likely resonated for observers like Tibbs.

Quiety legacy: Esther Tibbs-Marshall's lasting impact

This annual statement analysis is one of the last indications of Tibbs' professional life that can be found to date. The 1939 Jacksonville city directory still lists "Tibbs, Esther, (c[olored]), actuary Afro-Am Life Ins Co.," but the most significant event recorded about Esther that year is her second marriage, to physician C. Herbert Marshall, an accomplished and energetic doctor from Washington, D.C.

It's not clear how Tibbs met Marshall, although given their work in the medical and life-insurance fields, they might have met professionally. Shortly after their July 1939 marriage they moved to Georgetown, where Marshall ran a medical practice founded by his father. Also that year, he became the head of the D.C. chapter of the NAACP and campaigned against police brutality and discrimination in government employment.

Much more can be read about Marshall's activities in the following decades: crusading for the American Medical Association to admit Black physicians in the South, spearheading neighborhood improvements in Georgetown and pushing to eliminate segregated public spaces. He became celebrated as Georgetown's unofficial "mayor" and a keeper of its rich history.

For Tibbs-Marshall, however, data points are sparse. A 1940 membership listing of the American Statistical Association includes "Marshall, Mrs. Esther Tibbs," consulting actuary. In her son's 1942 birth announcement, she's described as "the former Esther V. [sic] Tibbs, one of the few Negro insurance actuaries." Five years later, the Chicago Bee noted Esther's quick visit with her old friend, newspaper editor Olive Diggs, and in the 1950 census, her occupation is given as "Misc. accounting work/own business." Later references are limited to mentions in city directories and relatives' obituaries.

Tibbs-Marshall died on October 19, 1983, five months after the passing of her husband of more than 40 years. Her death notice in the *Washington Post* describes her as a beloved wife, mother and grandmother, a woman with many relatives and friends. Her later life was private and largely unknowable, at least through archival sources. While it's tempting to characterize Tibbs' story as one of professional energies bottled up in a domestic sphere, it would be unwise to make sweeping assumptions about her post-1939 career from those blank spots in the newspapers.

What *is* available is the record up to 1939, and a fascinating record it is. Unlike her 1930s colleagues Spaulding and Walker (son of Universal Life founder Joseph Edison Walker), Tibbs had no obvious family connection to the insurance industry, no insider to mentor her. She was, however, a bright young woman who parlayed her University of Michigan statistical training into dynamic achievement, building an insurance career that was unusual for many women of her time. Despite its frustrating gaps, the archival record preserves a roster of accomplishments deserving of a closer look.

Liz Haigney Lynch is a genealogist and writer whose work has appeared in the Miami Herald, the Sun-Sentinel of Fort Lauderdale, and the Chicago Sun-Times. She is vice president of the Association of Professional Genealogists' New Jersey chapter.

Regulating Fairness

The CAS Research Paper Series on Race and Insurance Pricing Delivers Greater Insight into Potential Bias in Insurance Practices

By ANNMARIE GEDDES BARIBEAU, CAS RESEARCH MANAGER

Detecting and addressing potential bias in ratemaking and other insurance practices will continue to be a pressing concern in the future — regardless of the political climate.

The reasons are manifold: The regulatory appetite to consider potential bias in rating, the evolution of artificial intelligence (AI)-based modeling and the continuing explosion of data sources amid demographic and economic changes are also impacting the insurance industry.

To err with bias is human — and often happens without realization. People perceive their world through filters, including life experience, socioeconomic background and education. Unintentionally using economic conditions as a proxy for an ethnic group, for instance, is a form of bias.

Our understanding of bias is also evolving. In the 1940s, states adopted rules that precluded insurers from collecting racial data. Bias can be very subtle — data can lack context, and bias can be embedded in model design. AI can introduce bias without people realizing it.

"Actuaries have the expertise to play a significant role in identifying and addressing potential bias," said Mallika Bender, CAS staff actuary and manager of the organization's Race and Insurance Pricing Series.

Phase II of the CAS Research Paper Series on Race and Insurance Pricing builds on actuarial knowledge concerning potential bias in insurance practice that began in 2020. Released from August 2024 to March 2025, its six research papers explore

several angles of mitigating potential bias in insurance, including the evolving regulatory landscape, how to detect bias in the ratemaking process and the potential unintended consequences of adjusting rating factors.

"Actuaries are being challenged to navigate a complex set of regulations, and the papers are a useful set of tools for navigating that effectively," said Jim Weiss, former CAS vice president of research and development when Phase II of the series began. Weiss, *AR* editor in chief, also published an independent paper on managing potential bias in insurance models in *E-Forum* last year.

CAS Past President Roosevelt C. Mosley, who was instrumental in establishing Phase I of the series, observed, "The state of the regulatory environment regarding fairness is continually evolving." He also warned, "Actuaries need to pay attention or risk getting too far behind."

"The state of the regulatory environment regarding fairness is continually evolving. Actuaries need to pay attention or risk getting too far behind."
—Roosevelt Mosley

Evolving regulatory landscape

Three research reports explore the regulatory landscape. "Regulatory Perspectives on Algorithmic Bias and Unfair Discrimination" and "A Practical Guide to Navigating Fairness in Insurance" discuss the National Association of Insurance Commissioners' (NAIC) initiatives and separate activities of individual U.S. states. "Comparison of Regulatory Framework for Non-Discriminatory AI Usage in Insurance," released jointly with the Society of Actuaries, also provides a window into how regulators outside the U.S. are considering potential discrimination arising from AI use.

Understanding how regulators currently perceive potential bias in insurance is a crucial first step in determining how the industry may move forward in the future. The "Regulatory Perspectives" paper features responses from 10 of the 50 state insurance departments that responded in a CAS-sponsored survey in 2024.

Actuaries might be surprised to learn that actuarial soundness — considered paramount in ratemaking — was perceived by many surveyed regulators as insufficient for showing that insurance pricing is not impacted by bias.

"The authors found that the majority of regulators surveyed did not agree that profitability metrics should be considered with respect to algorithmic bias," said Weiss. But "the majority did feel statistical fairness tests and variable explanations should be."

Meanwhile, despite many regulators' concerns about algorithmic bias, few were actively addressing the issue in their respective states. "There was consensus by a majority of the regulators that the issue would be more effectively addressed on a national rather than a state-by-state level [through the NAIC]," Weiss said.

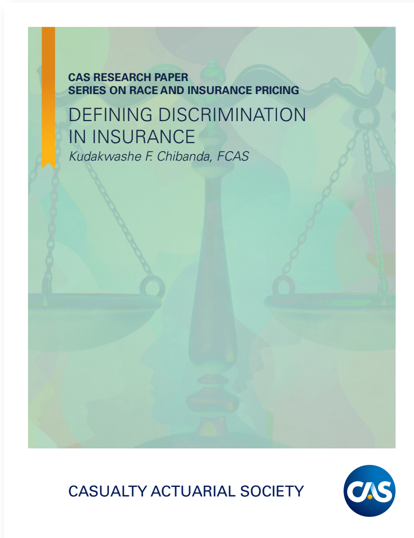
Regulators generally agreed that insurers should use multiple bias-testing

A Brief History of the CAS Research Paper Series on Race and Insurance Pricing

The impetus for Phase I of the Race and Insurance Pricing series began in 2020. "Practically every industry had a renewed focus on identifying bias in their sectors, especially with respect to race and ethnicity," explained Mallika Bender, CAS staff actuary and manager of the organization's Race and Insurance Pricing Series. "The National Association of Insurance Commissioners launched its Special Committee on Race and Insurance, and the CAS endeavored to make sure actuaries had the foundational knowledge to engage with regulators and address potential bias in their work."

The four research reports in Phase I of the series, released in 2022, set the foundation for the research papers. Phase II papers explore the opportunities and limits of data and methodology, including AI.

In comparison to Phase I of the series, Phase II fleshes out the specifics of how to mitigate bias, said Roosevelt C. Mosley, president of Pinnacle Actuarial Resources. "These papers are very practical and written in ways actuaries can approach and grasp," he said. "It was a really good step, and I am really happy to see that Phase II did that."



methods but had mixed views about applying them to populations by race or ethnicity. Some respondents raised concerns about the potential accuracy of approaches used to infer race or ethnicity such as the Bayesian Improved First Name Surname and Geocoding (BIFSG).

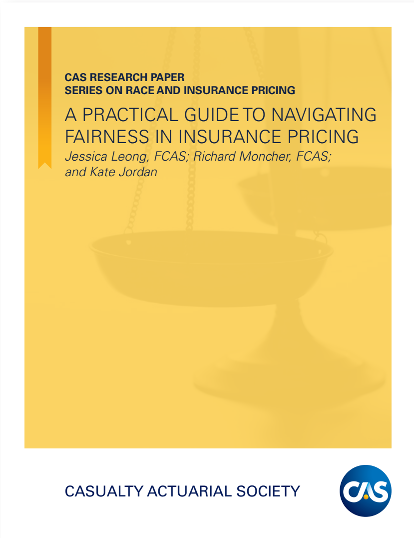
The "Regulatory Framework" research paper compares the views of regulators from the U.S., Canada, Asia and the European Union regarding the potential impact of AI and its potential for introducing bias. "Regulators across the world have not figured out how to regulate AI in general, let alone in the insurance industry," said Ken Williams, CAS chief of advocacy and staff actuary.

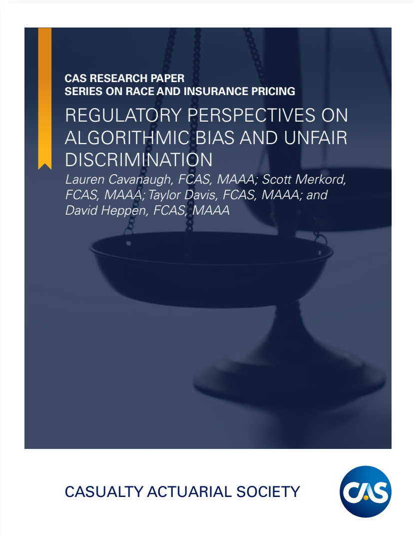
"Regulators are concerned about whether or not the bias in AI will hurt the consumers," Williams said. He cited Table 2 (page 10), where EU regulators identify AI activities by degrees of risk to protected classes, such as consumers in low-income brackets. Notably, ratemaking and pricing bias are considered high risk for protected classes.

Detecting and adjusting potential bias

"Regulators are not mandating the need to understand what could be causing bias," Weiss said, whether it arises from input, training or programming. "Navigating Fairness" explains how to guard against and mitigate bias in all types of insurance models. This research paper can help actuaries more thoroughly explore the sources of bias, Weiss said. Williams added that the research paper can also benefit actuaries working for small- to medium-sized insurance companies, while laypeople can also gain insights into potential bias at a practical level.

From the viewpoints of the model-builder, manager and those responsible for monitoring risk across all of insurer models, "Navigating Fairness" allows for a comprehensive framework for ensur-





ing model fairness.

Like "Regulatory Perspectives," this research paper catalogs numerous regulations and legislation related to unfair discrimination. Actuaries will appreciate the report's structured guidance in Table 2 (page 13), Williams said, because it covers model governance and fairness considerations through a series of linear steps — from gathering data to model implementation. The research paper also features a list of data categories considered higher risk, such as medical cost, social media and internet usage data.

Using hypothetical insurance pricing examples, the paper steps through methodologies that actuaries can apply to their own pricing data.

Another research paper, "Practical Application of Bias Measurement and Mitigation Techniques," published as Part 1 and Part 2, is a handbook that guides actuaries through the process of testing models for fairness. Using hypothetical insurance pricing examples, the paper steps through methodologies that actuaries can apply to their own pricing data.

"Part 1 — Types of Bias, Imputing Protected Class, and Simple Fairness Tests" illustrates how to apply the BISG method to infer race and ethnicity and includes essential caveats and data cleansing steps. Building upon three fairness tests mentioned in the Phase I research paper, "Methods for Quantifying Discriminatory Effects on Protected Classes in Insurance," the paper shows how independence, separation and sufficiency can be applied to premium and loss ratio data. The research also explains the benefits and limitations of these metrics.

"Part 2 — Advanced Fairness Tests, Bias Mitigation, and Non-Modeling Considerations" illustrates additional approaches that may better address nuances in insurance data, such as variations in the distribution of protected groups across different rating factors. The report also outlines several technical approaches that can be applied before, during or after the modeling process if fairness concerns arise.

Variable views

When considering the potential of specific variables to carry bias, regulators expressed varying concerns in the "Regulatory Perspectives" research paper. Regulators shared concern that rating factors such as homeownership and occupation, as examples, could carry bias.

To Williams' surprise, however, "regulators showed less concern for the motor vehicle driving record as a rating variable when some research suggests that protected groups may be more likely to be pulled over by police for driving infractions." These issues were explored in the Phase I paper, "Understanding Potential Influences of Racial Bias on P&C Insurance: Four Rating Factors Explored."

Since telematics data directly gauges driver behavior, it has the potential to reduce reliance on traditional rating

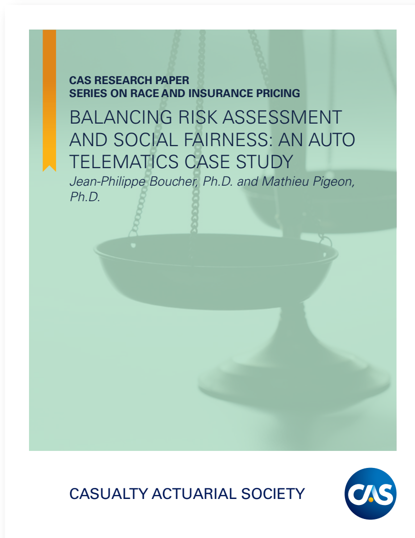
Fearlessly Facing Bias: Race and Insurance Pricing Research Papers

Phase I

- **Approaches to Address Racial Bias in Financial Services: Lessons for the Insurance Industry**, Members of the 2021 CAS Race and Insurance Research Task Force
- **Defining Discrimination in Insurance**, Kudakwashe F. Chibanda, FCAS
- **Methods for Quantifying Discriminatory Effects on Protected Classes in Insurance**, Roosevelt Mosley, FCAS, CSPA, and Radost Wenman, FCAS
- **Understanding Potential Influences of Racial Bias on P&C Insurance: Four Rating Factors Explored**, Members of the 2021 CAS Race and Insurance Research Task Force

Phase II

- **A Practical Guide to Navigating Fairness in Insurance Pricing**, Jessica Leong, FCAS; Richard Moncher, FCAS; and Kate Jordan
- **Balancing Risk Assessment and Social Fairness: An Auto Telematics Case Study**, Jean-Philippe Boucher, Ph.D. and Mathieu Pigeon, Ph.D.
- **Insurance**, David Schraub, FSA; Jing Lang, FSA; Zhibin Zhang, FSA; and Mark A. Sayre, FSA
- **Potential Unintended Impacts of Bias Mitigation on Other Protected Class Dimensions**, Gary Wang, FCAS, CSPA, and Michael K. Chen, FCAS, CSPA
- **Practical Application of Bias Measurement and Mitigation Techniques in Insurance Rating (Part I)**, CAS Race and Insurance Pricing Task Force
- **Practical Application of Bias Measurement and Mitigation Techniques in Insurance Rating (Part II)**, CAS Race and Insurance Pricing Task Force
- **Regulatory Perspectives on Algorithmic Bias and Unfair Discrimination**, Lauren Cavanaugh, FCAS; Scott Merkord, FCAS; Taylor Davis, FCAS; and David Heppen, FCAS



factors. "Balancing Risk Assessment and Social Fairness: An Auto Telematics Case Study" considers which traditional rating factors that telematics might replace. By comparing the impact of telematics on both synthetic data and an individual Canadian insurance company's data, the research reveals the impact of telematics on certain rating variables while stressing that results will vary by insurance company, Williams said.

"If you accept the findings with the synthetic data," Weiss offered, "you have a pathway on how you can take out some of the proxies and replace them with first order relationship to loss that feel more causal and start to fit with regulation." He added that the general "thought process is helpful for actuaries as well."

Consider the use of geography and territories for ratemaking. According to the "Telematics" report, territory was not a significant factor when apply-

ing telematics data to synthetic data. However, insurer data could not validate this conclusion. Meanwhile, surveyed regulators have mixed opinions of territory as a rating factor, according to the “Regulatory Perspectives” report.

Age, a time-honored factor, did not raise concerns among the surveyed regulators. Perhaps they are on to something. In the telematics study, an insured’s age, often a companion variable with gender, became less significant when using telematics information with both synthetic and insurer data. The same was true for marital status, another potentially sensitive variable.

Williams pointed out that telematics data, however, is not bias-free and can have unexpected impacts. He noted telematics information collected in the late hours of the night could disproportionately impact low-income earners who work second and third shifts.

The research also reveals that credit scoring — a controversial rating variable since its introduction more than 25 years ago and a concern to most survey respondents in “Regulatory Perspectives”—maintains predictive value even when using telematics. “Few other rating variables measure the likelihood of a future claim as well as credit-based insurance scoring does,” Williams observed.

The finding that credit-based insurance scores remain significant when used with telematics, said Mosley, a co-author of the Phase I research paper “Quantifying Discriminatory Effects,” underscores the significance of using credit scoring. “All of the work that has been done on credit-based insurance scores has shown that they do not have the negative impacts people claimed they do,” he added.

Unintended consequences

Ratemaking is a delicate art that balances multiple factors and considerations to ensure available and affordable coverage for consumers while maintaining insurer solvency and profitability.

Ratemaking is a delicate art that balances multiple factors and considerations to ensure available and affordable coverage for consumers while maintaining insurer solvency and profitability.

Regulatory changes to ratemaking, even to reduce potential bias against a class of customers, can result in unintended consequences.

The research paper, “Unintended Impacts of Bias Mitigation in a Competitive Insurance Market,” demonstrates the effect that regulation can have on individual insurance carriers and the broader insurance market. By examining and providing realistic yet theoretical outcomes under various regulatory scenarios, it reveals potential outcomes that might surprise regulators.

Understanding the ramifications of future regulation to reduce bias is critical, Mosley warned. “We are headed down paths that are completely new territory for most of us, and if we don’t spend time thinking what could go wrong, it could create an impact on the market that is difficult to manage,” he said. Regulators could introduce a requirement, he explained, that ultimately could grant one insurer "a real serious advantage or disadvantage because [they happen to insure] a different demographic mix of policyholders."

For instance, if a regulation limits rate differentiation by territory, insurers that serve primarily high-risk geographic areas might not be able to compete with carriers holding a more balanced book and a larger segment of policyholders, explained Bender. As a result, residents in riskier territories could face higher insurance costs or have fewer insurer options.

Although the topic is complex, the report is straightforward, Bender said. It includes numerous data tables illustrating examples of several potential unintended consequences.

Conclusion

As regulators and the insurance industry consider addressing potential bias in ratemaking and other insurance practices, experts advise actuaries to be familiar with the issues and potential impact on ratemaking and other insurance practices.

By providing a practical "suite of tools" actuaries can apply and adapt to their own work, Bender said, Phase II of the CAS Race and Insurance Pricing Series positions actuaries to add value and collaborate with the insurance industry.

Morgan Bugbee, CAS vice president of research and practice advancement, applauds "the rigorous and thoughtful analysis" in the Phase II research reports. "They address critical questions surrounding race and insurance pricing, offering data-driven insights that can help our profession better understand and serve diverse communities," he explained. "We hope these findings spur ongoing dialogue and continuous improvement in actuarial practices and the broader insurance industry."

To contribute to future phases of the CAS Research Paper Series on Race and Insurance Pricing, please contact Mallika Bender at mbender@casact.org.

Commercial Auto and Workers' Comp:
The Neverending Story of Two Remarkable Lines

By JIM WEISS

“Insanity is doing the same thing over and over and expecting different results.”

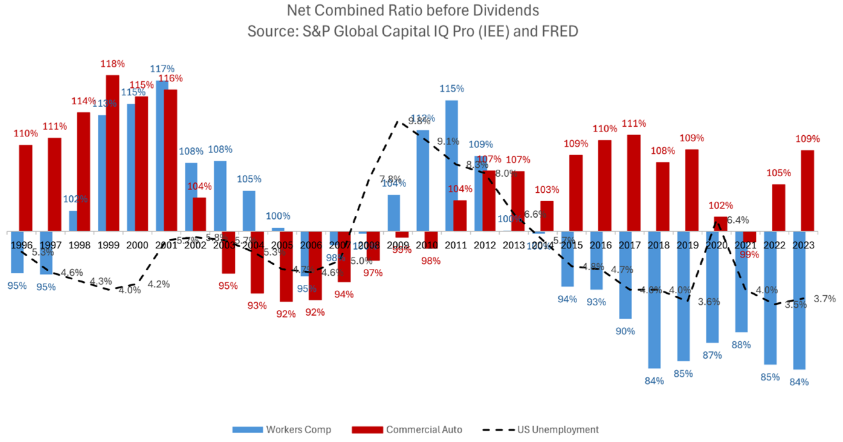
—Albert Einstein

“It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness … it was the spring of hope, it was the winter of despair.” Charles Dickens may have been writing about French revolutionary times in his famed introduction to *A Tale of Two Cities*, but he could just as easily have been describing the U.S. commercial insurance sector over the past decade. Workers’ compensation has been on a remarkable nine-year run of sub-100 combined ratios,[1] while commercial auto’s combined ratios have eclipsed 100 in 10 of the past 11 years.[2]

Many pundits expect these lines to continue their recent tendencies, with AM Best recently maintaining a stable outlook for workers’ compensation and a negative one for commercial auto.[3] However, one need only look back to 2021 for the last time AM Best had a negative outlook for workers’ compensation[4] and commercial auto yielded a sub-100 combined ratio. These were in (large) part pandemic-driven aberrations, but workers’ compensation also had a run of combined ratios over 100 between 2009 and 2012, while commercial auto yielded combined ratios in the 90s from 2003 to 2010. Figure 1 displays each line’s combined ratios since 1996.

In order to gain a sense of the longer-term future of these lines, we talked to several experts at rating agencies,

Figure 1. Commercial auto and workers’ compensation combined ratios by year



[1] https://www.insurancejournal.com/magazines/mag-features/2024/07/15/783435.htm.
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consultants, advisory organizations and brokers. None claimed to have a crystal ball. "I'm more of a rear-view mirror guy," joked Thomas Kenia, a senior managing director at Aon Reinsurance Solutions. Added Kevin Hughes, commercial auto actuarial director, Verisk, "The main problem actuaries face is a fundamental one: We are using data from the past to predict the future." However, with the benefit of some hindsight, actuaries can gain greater insight into how rates have consistently lagged behind trends for these lines, how they can evolve their approaches going forward and whether there are any indications the two lines could trade places anytime soon.

> **"The main problem actuaries face is a fundamental one: We are using data from the past to predict the future."**
> **—Kevin Hughes**

"A-B study for a profitable insurance market"

"When you look at workers' compensation, its underwriting profitability has really been the driver for the profitability we've seen in the entire commercial lines space," says David Blades, senior financial analyst, AM Best Company. "Commercial auto has been the exact opposite for the longest time, despite some of the initiatives carriers have taken — concerning risk selection, price adequacy and trying to combat some of the factors affecting frequency and severity. It's the loss leader." Blake Berman, managing director, strategic advisory, Guy Carpenter summarizes commercial auto's and workers' compensation's recent relative fortunes as follows: "The difference represents the litigation tax on the American economy. It's an A-B study. If you take the plaintiff bar's involvement out, many of the other elements of the claim costs are the same. If you take out the litigation and the extraordinary damages and all the court costs, you can have a profitable insurance market."

Recent research from the CAS and the Insurance Information Institute supports this, attributing up to $30 billion— roughly 10 combined ratio points — in payouts over the past decade to "social inflation," i.e., cost increases in excess of general inflation owing to factors such as litigiousness and third-party litigation funding.[5] Meanwhile, the no-fault nature of workers' compensation has generally insulated it from social inflationary pressures, although a recent article in *Independent Agent* magazine shared anecdotes that attorney involvement in workers' compensation claims is ticking up.[6]

Besides benefiting from the less litigious nature of workers' compensation, carriers have also played a hands-on role in the success of the line. "Companies have been able to employ their loss control experts to work with insureds, to help them take the necessary steps to improve their operations — cementing things that were done positively, reinforcing things that could be done better," says Blades. "Over time we've seen different periods where medical inflation has exacted more of a negative effect, where it's been going up. Keeping loss frequency under control has been able to mitigate some of the impact. The industry has done a really good job in workplace safety." Limited studies into the efficacy of insurers' loss control initiatives have shown reductions in the quarterly lost time claim frequency of roughly 2% per loss control visit occurrent during the preceding year.[7]

Blades has not observed the same loss control devotion from insurers in commercial auto compared to workers' compensation. "I think it took companies a little while to fully buy into the fact that they need to put meaningful resources behind driver safety training and other initiatives to get the injection on capital where those initiatives could make a difference," he says. Inexperienced drivers have compounded the pain. American Trucking Associations estimate a need for roughly 1,000,000 new drivers this decade, mostly due to retirements.[8] Virginia Tech Transportation Institute research indicated less experienced commercial motor vehicle (CMV) drivers had crash rates several multiples higher than more experienced ones even after controlling for age.[9] Kenia notes,

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[5] https://www.iii.org/press-release/social-inflation-contributed-to-30b-increase-in-commercial-auto-costs-paper-finds-030623.
[6] https://www.iamagazine.com/markets/workers-comp-the-most-profitable-major-line-of-business.
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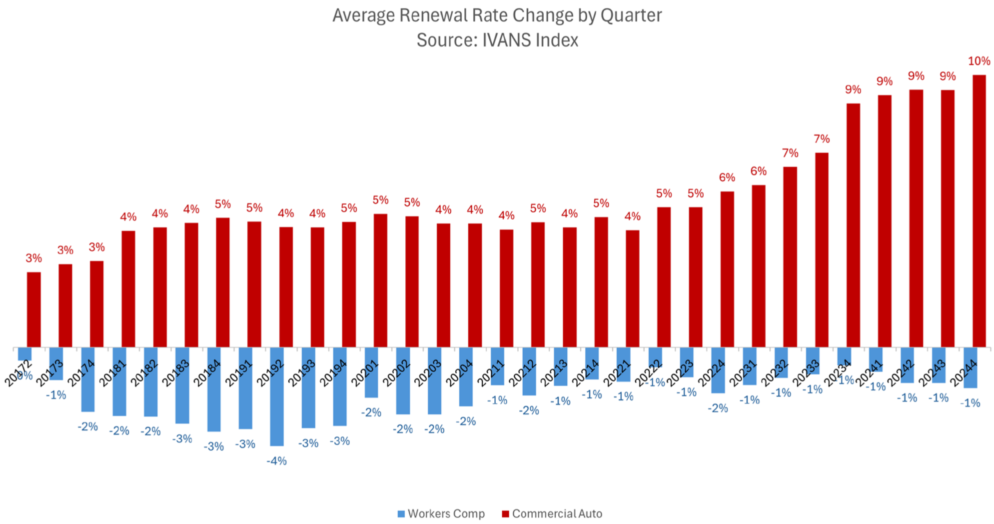
Figure 2. Commercial auto and workers' compensation renewal rate changes by quarter



"I think there is some reliance on vehicle technology to create benefits that exist directionally but are not a full replacement for the value of experience. Technology winds up being cheaper for businesses than experience, but drivers with more tenure have fewer accidents on the job. Statistics show that."

"It may be time to let it go"

Carriers and their actuaries have been fully aware of premium redundancies and inadequacies in the line in question. The IVANS Index, which has tracked renewal rate changes across hundreds of insurers since 2017, shows commercial auto rates have increased and workers' compensation rates have decreased every quarter since the inception of the index. Figure 2 displays the quarterly values of the index for each line. The commercial auto increases never rise above 10% and the workers' compensation decreases never rise above 4% — so they have not made a huge impact on annual results.

Some of this may be by design. An *AR* article in 2019 spoke of carriers' tendency to view commercial auto as a loss leader.[10] Blades opines that commercial auto may still not always be the top priority for carriers on multiline opportunities. "[In some cases] carriers might take an account because the general liability or workers' compensation or even the umbrella is really the prize for that account, and you might accept a pretty thin margin if any on the commercial auto," he says. "I do think in some cases commercial auto has been more of an attendant line, not the driver."

Social inflationary impacts on general liability and umbrella may temper carriers' appetites to accept less on the auto, but insurers still may find themselves taking a haircut. "The challenge with auto is it's highly competitive," says Berman. "There are fairly low barriers to entry. Whenever you start to see green shoots, there is often a wave of managing general agents (MGAs) and new entrants coming in to take advantage of it." Hughes adds, "If many insurers are underpricing, there are going to be great swaths of the line that you cannot compete for and may not want on your book at that rate. If some of that is already on your book, it may be time to let it go."

Price sensitivity tends to be lower for workers' compensation. "You've seen for many years an environment characterized by decreasing rate level," observes Berman. "The claim experience for injured workers has improved as carriers have created a more cohesive network of providers and care plans to help people get healthy and back to work more quickly — and carriers are providing this at a reduced cost because of the better protections for workers." The intricacies of carriers' value proposition also create barriers to entry. "We have seen a relatively small number of newer companies come into the competitive environment, that might not have legacy issues, and that come in a little more aggressively," says Blades. "However, workers' compensation requires unique expertise in the

[10] https://ar.casact.org/commercial-auto-woes-what-will-it-take-to-make-the-line-profitable/.

underwriting, claims and loss control disciplines."

Actuaries and their time-honored techniques have likely also played an implicit role in overshooting and undershooting workers' compensation and commercial auto, respectively. "A challenge for actuaries is that they're kind of stair stepping to update their assumptions," says Berman. Techniques such as Bornhuetter-Ferguson premise loss estimates on *a priori* views of how a line will perform, which may be slow to evolve. "It is a little bit at a time, and it is very hard to keep up with an accelerating trend," he adds. "Carriers are undoubtedly loading more [commercial auto] IBNR. Actuaries are using higher trend factors. But actuarial science has a hard time predicting behavior challenge."

"A heavy investment in analytics seems to be the price of entry into the group of carriers who are consistently making money in commercial auto." —Kevin Hughes

The pandemic exacerbated matters as carriers paused filing rate changes until some of the uncertainty resolved. "[For commercial auto] most carriers had not taken even a 'customary' increase the previous year, and that had to be made up, along with necessary increases from the severity side, as frequency returned to something like normal," says Hughes. "Severity trend did cool from the red-hot numbers of 2022, but costs continued to rise — faster than what I would call normal — right up to the present day. Premiums had some catching up to do, and we had a (brief) moment at ISO where filing loss cost increases of 40% or higher became a matter of course."

"Actuarial methods bear some attribution for deficiencies"

Insurers have learned from the remarkable decade in these lines. "One advantage in dealing with uncertainty, that actuaries didn't have in 2022, is that we have just lived through the largest inflationary spike in loss severities in institutional memory," says Hughes. "We have spent the last three years thinking long and hard about how best to react to this sort of thing. I think the industry is mentally better equipped to deal with future disruptions than it has ever been."

There is also optimism that rate actions may begin to catch up with trends. "I think that some of the recent price momentum is going to manifest itself in additional earned premium and create some tailwinds that push commercial auto towards some improvement," says Blades. For workers' compensation, he adds, "a couple of things we keep looking at are reserve trends and prior-year reserve redundancy. Even though reserve margins are shrinking a little bit we're still seeing redundancies. However, margins could shrink to a point where enough is enough — and we are seeing this mentioned in some outlooks."

Commercial auto struggles and workers' compensation triumphs have been relatively broadly distributed across carriers, with the majority writing the former taking underwriting losses and the majority writing the latter achieving gains. However, exceptions such as Progressive — a company that consistently outperforms in commercial auto — are potentially instructive. Blades describes such carriers as "really knowing what their sweet spot is from a risk appetite perspective."

"A heavy investment in analytics seems to be the price of entry into the group of carriers who are consistently making money in commercial auto," adds Hughes. "It should go without saying that the analytics have to be utilized with a focus on properly underwriting the auto risk on its own, not as a throw-in or an afterthought." Such sharpened focus would not be entirely different from the industry's commitment to workplace safety described previously in relationship to workers' compensation.

History also suggests external forces affecting underwriting performance may be more predictable than actuaries give them credit for being. "You had a recession in the early 1990s that coincided with a period of market softening," says Berman. "During this time auto was booked conservatively and proved to be redundant. Then the next time we had redundancies in auto was leading up to the 2008 crisis. You saw better than expected performance in those years and even 2020 has been holding up very well. So there definitely appears to a relationship between slowing economic activity and reduced commercial auto losses. Workers' compensation can be the other way, where recession years see an influx of claims activity. 2020 could have been a lot worse without the Payroll Protection Program" (which helped preserve rateable payroll

Table 1. Relationship between unemployment and combined ratio

Time Horizon	Pearson ρ			R^2		
	Between Auto CR and Unemp.	Between WC CR and Unemp.	Between Auto CR and WC CR	Between Auto CR and Unemp.	Between WC CR and Unemp.	Between Auto CR and WC CR
1999:2023	–30%	52%	7%	.09	.27	.01
2004:2023	–24%	81%	–40%	.06	.65	.16
2009:2023	–60%	88%	–42%	.36	.78	.18
2014:2023	–40%	57%	–7%	.16	.33	.01
2019:2023	–49%	52%	–93%	.26	.27	.86

on policyholders' books).

The sinusoidal patterns of each line's combined ratio trajectories in many cases tracks well with econometrics such as the U.S. unemployment rate. Table 1 displays Pearson's correlation coefficients and R-squared statistics for data from Figure 1.[11] The former measures the strength of the linear relationship between two variables (values closer to positive or negative 100% indicate stronger relationships), while the latter measures the proportion of one variable's variance that is statistically explained by the other (with 1.00 essentially being a perfect fit). Workers' compensation performance correlates strongly with unemployment over various time horizons, while auto shows moderate to strong (negative) correlation — although R-squared statistics are on the lower side for both. "Is that enough for economic activity to be a governing variable in a pricing model?" asks Berman. "I wouldn't necessarily propose that, but it is useful for informing comparisons between accident years." Such has been a source of literary debate that flares up roughly once per decade.

Emilio Venezian's 1985 paper on profit cycles, sometimes unkindly referred to as the "actuaries are dumb" theory, suggests that overly naïve extrapolations from past to future create the underwriting cycle — and the author even partitions lines of business into three categories based on the nature of their cyclicality. [12] Commercial auto and workers' compensation ended up in different groups. Later work, including by CAS Past President Jessica Leong, synthesizes institutional frictions with other factors noted in this article such as market competition and economic cycles.[13] Table 1 bears similarities to Table 3 of Forray and Ballweg's 2013 paper on reserve cycles, which analyzes correlations between unemployment and adverse development. Those authors conclude, "actuarial methods bear some attribution for deficiencies that have been present within the carried reserves of the property and casualty insurance industry over time," even though "actuaries were using standard and accepted — in fact, the most accepted – actuarial methods."[14]

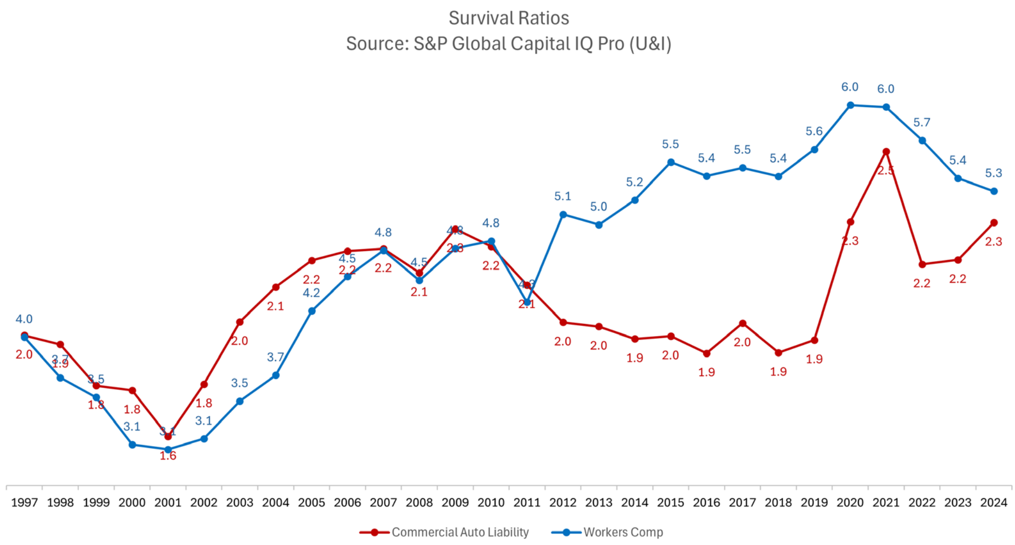
"An overshoot or … a new normal?"

If actuaries are to diverge from semimindlessly projecting these lines' past into the future, and econometric data is too lagged or incongruent to factor in effectively, then identifying the next inflection point in the underwriting cycle will require fresh vision and ingenuity. While few of the experts we interviewed forecast large scale change for commercial auto or workers' compensation in the near future, many offered indicators and Rubicons for if and when the lines' fortunes may reverse.

There do exist some indicators that suggest commercial auto could be approaching reserve adequacy if not redundancy. For example, Kenia points to survival ratios, which are calculated as reserves at the beginning of a calendar year divided by payments during the year, as one metric he tracks. Lower survival ratios generally indicate less adequate reserves, for example, during the lean years of the late 1990s and early 2000s. "I think an open question [for auto] is, are we going to see an overshoot, or are we going to see a new normal?," he asks. "There is no downplaying of the underwriting result over the past 12 years. But the survival ratio has marginally improved to around what it was in say 2010 or 2011." Figure 3 displays survival ratios by line. (Note that workers' compensa-

[11] https://fred.stlouisfed.org/series/UNRATE.
[12] https://www.jstor.org/stable/252782?seq=1.
[13] https://www.casact.org/sites/default/files/2021-07/US-Property-Casualty-Wang-Major-Pan-Leong.pdf.
[14] https://www.casact.org/sites/default/files/database/forum_13fforum_10-forray-ballweg.pdf.

Figure 3. Survival Ratios



tion yields higher ratios in general as a result of the lengthy nature of permanent disability claims.) Even several years removed from the pandemic, commercial auto's ratios are approaching the levels they achieved during the 2000s period of profitability, while workers' compensation's ratios are inching towards levels last seen in the early 2010s, when the line was unprofitable.

Kenia cautions that these metrics don't necessarily imply happier times ahead for commercial auto insurers. "It could be the case that [higher survival ratios] are a necessary but not sufficient condition for profitability. The development pattern has also been lengthening [which could also partially explain the increased survival ratios]," says Kenia. He also points to tort reforms in states such as Florida and Georgia as tailwinds that could potentially shorten development patterns and improve the overall health of the line.

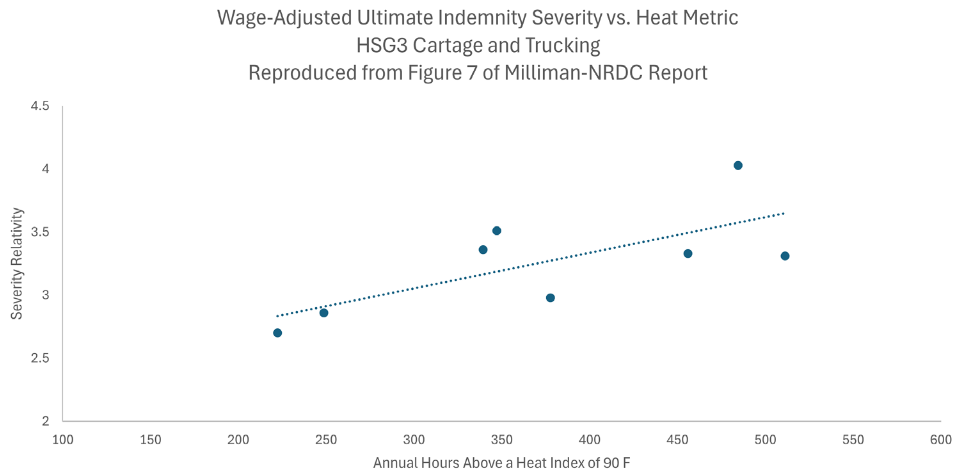
As far as workers' compensation goes, a strong economy evidentially and intuitively tends to go hand-in-hand with stronger workers' compensation performance, and market volatility in the first quarter suggests that is not necessarily something to be taken for granted. However, the economy is not the only external force with potential to impact profitability.

Climate change is an emerging risk on many organizations' risk registers, but they do not necessarily first think of the risk in connection with workers' compensation. Garrett Bradford, GISP, principal and GIS consultant, and Sheryl Hou, consulting actuary, were two of the researchers on a recent study Milliman conducted on behalf of the Natural Resource Defense Council regarding impacts of excessive heat on workers' compensation costs in North Carolina.[15]

The Milliman researchers found statistically significant correlations between (wage-adjusted) indemnity costs and the annual hours above a heat index of 90°F / 32°C for several heat-exposed occupation groups. Their quantity of interest was the delta between each heat-exposed occupation group and a control group consisting of clerical and professional employees. Intriguingly, commercial auto intensive occupations such as Cartage and Trucking and Commercial Enterprises occupations exhibited roughly 70% correlations between the heat index and the indemnity severity, and these were statistically significant at the 15% level in their analysis. Figure 4 reproduces this analysis from the study. Bradford speculates, "While initially surprising, this relationship makes sense if you think about warehouse workers in this sector who might be subjected to heat-stress or to short-haul employees who are in and out of their vehicles. In some cases, I can think of delivery vehicles that don't have AC or even doors." Construction occupations also showed a roughly 50% correlation but with lower corresponding statistical significance.

[15] https://edge.sitecorecloud.io/millimaninc5660-milliman6442-prod27d5-0001/media/Milliman/PDFs/2023-Articles/6-27-23_NRDC-Excessive-Heat-Report-NC.pdf.

Figure 4. Sample relationship between heat metric and severity metric from the Milliman Study



We generally observe higher indemnity severities as the heat metric increases.

The study did not show as strong correlations between medical cost and heat indices as with indemnity. Bradford speculates this may be a reflection of claimant behavior. "Medical conditions that can be exacerbated by excessive heat may be lagged. If you go to the hospital a few days after an event because you're still feeling sick, the incident may never be attributed to heat or having occurred in the workplace. While we didn't have access to workers' compensation claims data for this analysis, our analysis of healthcare utilization shows these lagged effects for at least three months." Other heat impacts could also manifest as workers' compensation claims. Says Hou: "With more extreme weather events like the ones we have seen recently, there may be more post-traumatic stress disorder (PTSD) claims from first responders." As far as how carriers can take steps to protect themselves, Bradford also hearkens back to a key factor Blades raised to help explain workers' compensation's good fortunes: "You can always tweak your territory factors and get some sort of impact there, but the bigger opportunity may be to show employers what to do to protect employees' health and safety during heat events."

"You can always tweak your territory factors and get some sort of impact there, but the bigger opportunity may be to show employers what to do to protect employees' health and safety during heat events."

The end, or just the beginning?

Spoiler alert: The ending lines of *A Tale of Two Cities* come straight from its protagonist, Sydney Carton, as he is being led to the guillotine. "It is a far, far better thing that I do, than I have ever done; it is a far, far better rest that I go to than I have ever known." For commercial auto and workers' compensation, actuaries have largely been telling the same story for a decade — longer if we consider the economic cycle and the role of actuarial techniques in the underwriting cycle. That may well net out to be OK when each has an "identically opposite" commercial line at the ready to offset its outsized positive or negative results. However, as the world changes at breakneck speed, the organizations best equipped to get ahead of the cycle may be the ones who are willing to stick their neck out a little to gain a more precise view of what is coming next.

Jim Weiss, FCAS, CSPA, is divisional chief risk officer for commercial and executive at Crum & Forster and is editor in chief for Actuarial Review.

DEVELOPING NEWS

Tariffs Return: How Will They Impact Insurance? By SANDRA MARIA NAWAR

A trade war is in full swing, with the new tariffs imposed by the U.S., slowing down global economic activities and leading to a price surge for products flowing between countries. The effect of the tariffs are especially significant in countries where retaliatory tariff measures are also implemented, such as the tariffs China placed on U.S. goods in April 2025. Insurance products will take a hit since most P&C lines of business are sensitive to repair and replacement costs. The sheer volume of the impact will depend on the duration of the tariffs, reliance on source materials and supplies from trading partners and ability to leverage local alternatives whose prices are not impacted by tariffs.

U.S. home insurance will be impacted by a significant increase in building and reconstruction costs due to the dependency on Canadian lumber (Canada being the U.S.'s biggest foreign lumber supplier). Other examples of construction materials that will become costlier are gypsum used in drywalls imported from Mexico and fixtures such as appliances and countertops from China. Canadian auto insurance will be vulnerable to inflation on U.S.-supplied auto parts. This will impact physical damage coverages such as collision and comprehensive, which account for 10–20% of the total premium. Tariffs will create another ripple effect where new cars will likely become more expensive, which will limit supply and drive up demand on used cars, increasing purchase prices of cars and pushing replacement costs further up.

The exposure to tariffs in the auto supply chain and home-building costs isn't large enough to pose significant risks to company liquidity yet, but it will lead to an insurance price surge that will eventually be paid by the consumers.

What this means for actuaries: Actuaries will need to be ready to reprice their products based on the products' exposure to the announced tariffs, leaving consumers with additional price inflation. Actuarial pricing is a long cycle that relies primarily on experience from historical data. In this situation, actuaries are expecting a price increase prospectively, yet the historical experience will not reflect those changes until a few years later. Alternatively, actuaries will need to revert to proxy methods to estimate the impact of tariffs on insurance claim costs. Even if estimated correctly, the challenge remains to have those rates approved by regulators who rely on traditional methods using experience. Preemptive pricing hasn't been accepted widely by regulators, so insurance prices are likely to lag by a few years. If tariffs are only implemented for a limited duration, then the industry might be able to fully absorb the impact with minimal changes to pricing.

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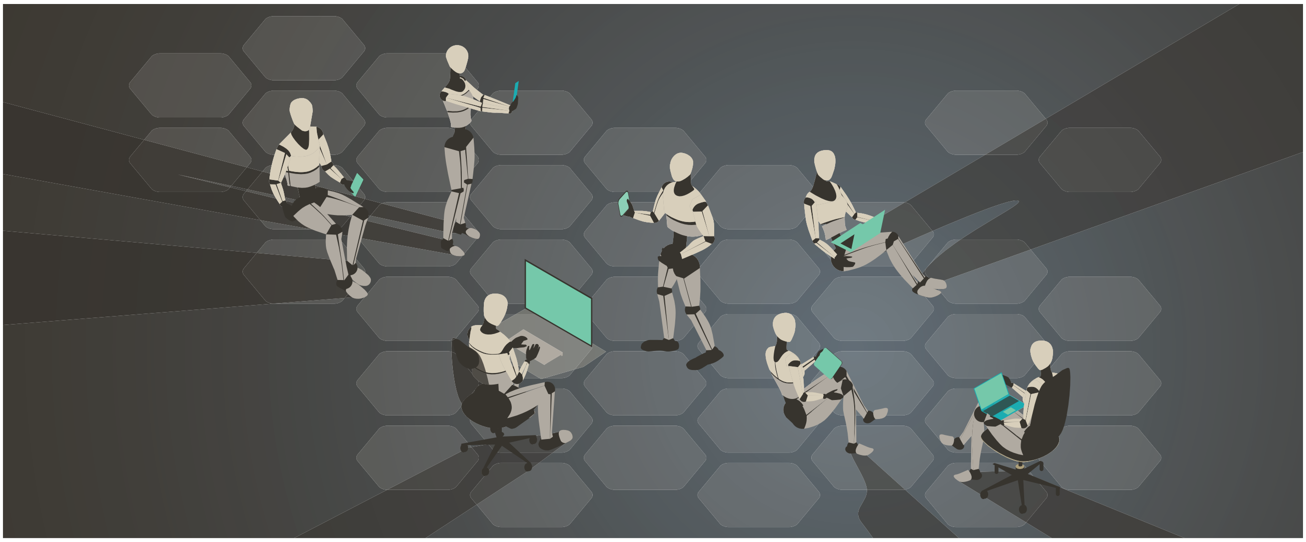
Agentic AI: Your New Actuarial Coworker By XUAN YOU

A common misconception about large language models (LLMs) is that they're merely sophisticated chatbots that struggle with mathematical tasks. This view arises from seeing LLMs in isolation, as they are designed to predict the next token in a sequence rather than perform arithmetic. In other words, when an LLM is asked, "What is 56,372 x 34,252?" it sees only a string of tokens, not a math problem as a human user would. However, when equipped with the right tools (like a calculator), LLMs can tackle complex mathematical challenges, even solving problems from the advanced competitions like American Invitational Mathematics Examination (AIME).

This is where AI agents come in. AI agents are LLMs enhanced with the ability to use specialized tools, maintain context over time, and make autonomous decisions. Unlike a basic chatbot, these agents can break down complex problems into steps, choose appropriate tools for each step, and execute them sequentially with the broader objective in mind. Think of it as the difference between having a conversation with someone versus having a skilled assistant who can access calculators, code, and databases to help solve problems. As Microsoft notes, "AI agents are not only a way to get more value for people but are going to be a paradigm shift in terms of how work gets done."

What this means for actuaries: The path forward lies in learning to work alongside AI agents, much like how we mentor and guide interns. This collaboration requires two key competencies. First, we need to develop technical expertise in building with these agents. This includes understanding how to effectively communicate tasks, recognize agents' capabilities, and acknowledge agents' limitations. Second, and perhaps more crucially, we must learn to manage our customized agents. This involves identifying which tasks to delegate, providing guardrails to prevent errors, establishing clear success metrics, and creating feedback loops that enable agents to reason, learn and self-correct. The future of actuarial work is not about AI replacing actuaries but about AI amplifying actuarial expertise.



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DEVELOPING NEWS

Wildfire Model Legislation Spreading to Colorado By SARA CHEN

A bill that's making its way to the governor's desk in Colorado will increase scrutiny on models used in rating or underwriting wildfire risk. After the California wildfires in January, Colorado introduced House Bill 1182: Risk Model Use in Property Insurance Policies (HB 1182), which, according to the text, applies to "insurers who use a wildfire risk model, a catastrophe model, a combination of models or a scoring method." It proposes the following:

- Include in rate filings a description of the model, its impact on rates and an explanation of how it is used in underwriting.
- Incorporate mitigation activities at the property, community and state levels into the models.
- Post on the carrier's public website information about discounts, incentives or adjustments that are available to policyholders who undertake mitigation efforts.
- Require a written notice to policyholders of their wildfire risk score and how much the score and mitigation efforts impacted the policyholder's rate or premium.

This bill comes as an effort to increase transparency around how wildfire risk is assessed and accounted for in rates. It also aims to encourage mitigation efforts. This bill is set to take effect January 1, 2026.

What this means for actuaries: Actuaries can anticipate completing more filing requirements when they submit their models for approval in Colorado. Any wildfire models in development or set to be in development will need to quantify the impact of mitigation activities. Actuaries can use their company's internal data in addition to publicly available data and research to estimate this impact. California has a similar regulation, Regulation 2644.9, to serve as a precedent. When developing wildfire models and risk scores, keep in mind that explainability is key for ease of filing. Ultimately, increased transparency helps bridge the gap between insurance carriers and policyholders.

Furthermore, we can safely assume Colorado and California won't be the only states pushing for more regulation around catastrophe models. HB 1182 may fan the flames for similar regulation to come to other states, particularly those that are wildfire-prone such as Washington and Oregon. In other parts of the country, states plagued with their own region-specific catastrophes may draw inspiration from HB 1182 and draft similar legislation to recognize homeowners' mitigation efforts.

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ON THE SHELF

Unclunked By JIM LYNCH

Actuary/CEO dons a historian's cap to tell his company's story

An insurance company's story is a history lesson. The company's highs and lows reflect the risks people face and the financial vicissitudes of any era.

CAS Fellow Marc Adee outlines what can be learned from one company, Crum & Forster, in "The Once and Future C&F," a brief but frank account of a company that is profitable now but underwent wrenching times, particularly in the late 20th century. Adee has been chief executive officer of the company since 2014. The free book can be viewed at https://www.cfins.com/freebook.

Adee's book is intended for the insurance veteran. He dedicates the book to "everyone who has engaged in a spirited discussion over a half point on their booked loss ratio." He assumes the reader has a deep understanding of insurer finances, discussing statutory surplus and marking bonds to market on the very first page. The assumption lets Adee focus on narrative without getting bogged down in terminology, but it may prove too deep for a casual reader.

Crum & Forster traces its roots to the 1822 founding of the North River Insurance Company, the name derived from the Dutch name for New York's Hudson River. Founder Richard Whiley was a Revolutionary era captain whose service on Governors Island put him into contact with New York's financial lords.

Whiley created a robust company in the nascent fire insurance market through strict underwriting. All buildings had to be inspected in advance, and the company wrote no building higher than the tallest ladders around — 80 feet.

Over the decades, standards remained high. The company grew as New York City did. It benefited in no small part from insurance regulations that required out-of-state insurers to have operations in the state.

Those regulations presented North River's secretary, Frederick Crum, and city underwriter, John Forster, an opportunity. Their firm acted, in essence, as the management team of any out-of-state insurer that would hire them. The company's chief clerk, James Ackerman, joined them.

Over the decades, standards remained high. The company grew as New York City did. It benefited in no small part from insurance regulations that required out-of-state insurers to have operations in the state.

It was a complicated relationship between the old insurer and the new underwriting shop. The three men seem to have remained at North River as they placed business through Crum & Forster. North River appears to have known and tacitly approved of their work.

By 1910 Crum & Forster was managing more than two dozen out-of-state companies.

"While no single company was large," Adee writes, "together they proved formidable." They were known as the mosquito fleet.

The agency used its profits to, across seven decades, take control of the fleet, including North River. World War I-era patriotism led United States Fire Insurance Company to become the flagship. Some others were merged out of existence. The enterprise expanded nationwide.

Depending on your perspective, the unusual structure had either a feature or a bug: Crum & Forster could post a profit, but individual companies could struggle. Shareholders in the individual companies could be poorly served.

Legendary investor Ben Graham made North River an object lesson in a 1940s lecture. He noted the company "has been satisfactory to the people running the business, to its agents and to its policyholders. Whether it is now satisfactory to the stockholders I don't think has ever been asked, and I don't think such questions are asked in any one of these companies."

Adee, as a successor CEO, deserves credit for highlighting Graham's harsh assessment. Indeed, it would be hard to tell the tale from here without a warts-and-all approach.

The company evolved with America's postwar prosperity. It added a suite of standard and specialty lines to its property coverage as the nation leaned hard into the theory that well-apportioned liabilities minimize negligence and create a safer world.

That idea took a pounding with the asbestos and liability crises of the 1970s and 1980s, crippling the right side of insurance balance sheets. Inflation, meanwhile, buffeted assets.

There were other problems. The industry itself had yet to develop the modern understanding of capital allocation and enterprise risk management.

Adee chronicles his predecessors' pain. In 1974, the company was writing \$800 million against \$200 million statutory surplus. (The modern leverage ratio is closer to 1:1.)

Worse, under statutory accounting standards of the time, all bonds were carried at amortized cost. By that standard, C&F's bonds were booked at \$112 million above market value ...

... aaaand liabilities were understated. C&F and the rest of the industry did not understand the billions eventually needed to fund asbestos and other ultralong liabilities.

"Quite a few insurance companies were technically insolvent," he writes, "and C&F was one of them."

He scolds Crum & Forster management of the day — not for falling into the problem, but for "not embracing the reality of the situation" and trying to solve it.

The company stumbled onwards until it was purchased in the early 1980s by Xerox, a company that made copier machines. Today, Xerox is better known for inventing the interface that became Apple's desktop but failing to realize the billions the invention was worth.

If you search online for "Canadian Warren Buffett," you'll come across Prem Watsa. Starting in 1985, Watsa took over a small Canadian trucking insurer and bought lusterless insurers, and using the same decentralized approach has grown the book value of his company, Fairfax Holding, by an astonishing 18.4% per year. In 1998, Fairfax offered \$680 million for Crum & Forster.

He scolds Crum & Forster management of the day — not for falling into the problem, but for "not embracing the reality of the situation" and trying to solve it.

The purchase reflected another late-century business trend: the rise of the conglomerate. The thinking: A competent manager could run any business. They just needed the proper suite of reports to monitor things.

This was the thinking that put a phone company, a hotel chain and the maker of Wonder Bread into the same company, ITT. It also put auto executive Robert McNamara in charge of the execution of the Vietnam War. Results were similar for both cases.

Xerox was a similarly bad fit with Crum & Forster, though the conglomerate fared better than most. It helped mend the balance sheet. It shaped C&F's insurance dabblings into a fleet of core companies, then sold them, until one remained — the namesake franchise — "a clunker," Adee writes, of random bits that didn't fit with the other sell-offs.

Few conglomerates remain. The best known is Warren Buffett's Berkshire Hathaway. Buffett is a value investor. He finds corporate diamonds that might have lost their shine but are well-run. He lets the management do their job.

Crum & Forster struggled through what became known as the Seven Lean Years but developed a few core competencies (New York property and small package, reinsurance, excess and surplus). These were the "acorns . . . that were starting to grow" when Adee became CEO in 2014. His contributions, he writes, have been to mold a culture that makes people want to work for the organization and to restructure the company.

He spiffed up the physical plant (he found 37 buckets around the Morristown office "collecting brown ceiling water") and built a culture of trust — "that the company would do what it promised" and that "the things that we promised to do would deliver results."

He mimicked Fairfax's decentralized structure, moving authority away from the corporate teams and into the individual business units. As Adee puts it, "What better way to open up career paths for high performers than having autonomous divisions for them to run?"

Results have been strong, with combined ratios under 100 for nine years through 2023 (the latest year available when the book was published) on premium growth over 150%.

Adee's slender work is a pleasant enough diversion, of greatest interest to his employees, but with ideas most insurance pros can ponder.

This reviewer's nits: He frames his early chapters around imaginary conversations that try to capture the spirit of, say, post-Revolutionary America or Gilded Age New York. These will appeal to some readers, but not all. And I would have enjoyed more discussion of underwriting strategies. Too often adjectives like "conservative" or "scary" described guidelines but the narrative lacked the detail to see what made them conservative or scary.

But with this book Adee had a different goal.

"Crum was very representative of companies through the two centuries of our history," Adee told Lori Chordas of AM Best TV late last year — in particular the Xerox-Fairfax era. It took 20 years to recover from those problems, he told Chordas, and another 20 to forget them.

"I've written this book for the next generation, so they don't have to go through that." ●

Modeling for Climate Change and Economic Stability

By JOURDAN VASAPOLLI

The Earth's temperature is rising. In 2024, the Earth's temperature increased 1.5° Celsius above pre-industrial levels for the first time in history. We continue to see record-breaking insurance losses globally due to increased weather-related damage. Ben Williams and Howard Kunst, presenters of the "Natural Catastrophe Insights and Outlook" RPM session, emphasize how the insurance industry has not kept up with the rapid evolution of climate-related risks. Climate change, of course, is a widespread issue affecting all continents around the world. Therefore, we should acknowledge that non-U.S. insurance markets, which are generally less robust and mature, are consequently at higher risk of a larger insurance protection gap.

To complicate matters further, there is a great deal of political turbulence around the topic of climate change. Kunst believes the actuarial catastrophe modeling community is somewhat shielded from the ever-changing politics around climate change. Upholding our data-driven integrity as actuarial professionals, changing political opinion should not have any impact on our modeling strategy or research. Nonetheless, we should certainly acknowledge that public policy and civic opinion on the topic can play a role in how our actuarial models and predictions are perceived. Kunst meets regularly with legislators on Capitol Hill and federal agencies including Freddie Mac, Fannie Mae and various mortgage lenders. These agencies are concerned with the potential scenario where a major weather event leaves the majority of U.S. citizens underinsured and unable to meet their financial obligations. Consequently, mortgage lenders will be on the hook for the unpaid debts on properties, and perhaps the federal government will need to step in to help.

As you can see, catastrophe modeling inclusive of climate change is extremely important in protecting people, their properties and our economy overall. Catastrophe modeling started out in a simpler era when companies modeled on observed losses and multiplied by a constant selected trend factor. As catastrophe risk has grown, companies now need more granular and sophisticated modeling approaches. Today, we see that many companies have progressed to modeling each peril separately. Williams notes that an intersection of catastrophe and capital modeling is a very sophisticated solution to proper exposure management. A further enhancement could be to consider allocating reinsurance costs to the areas most prone to incurring reinsurance costs from modeled catastrophe events thus allowing for deeper price segmentation and fairness.

There is a slew of catastrophe models available in the marketplace from a variety of agencies, and many insurers choose to purchase multiple forecasts from various agencies.

There is a slew of catastrophe models available in the marketplace from a variety of agencies, and many insurers choose to purchase multiple forecasts from various agencies. The problem is that certain peril forecasts (e.g., hurricane) from various agencies are highly correlated, which begs the question:

Are all these various forecasts adding value since they are all equally right and wrong? Probably not. It may be a better investment to focus on newer perils that vary more widely across the marketplace, such as wildfire or severe convective storm. Kunst believes that wildfire is the most difficult and least mature peril for the industry right now. The recent Los Angeles wildfires provide evidence that we're seeing more drought, higher winds and consequently more fires across the Western U.S. The Severe Convective Storm (SCS) category, which includes tornado, hail and straight-line winds, has also surged in recent years to become a focus area for the modeling community.

Catastrophe models are most effective when their assumptions and data are refreshed regularly. Kunst notes that for every degree the temperature increases, the atmosphere can hold ~7%

more moisture, which in turn produces more rain and flooding. We should ensure these peril models are regularly updated to reflect these changing assumptions. Property reconstruction costs are another critical assumption used in the models to better understand the financial impact of weather events. Aerial imagery, geocoding and other AI tools are becoming essential in tailoring models specifically to a region, neighborhood and home. For example, first floor height and ground elevation of a home are very predictive of the flood risk. This is the level of data granularity that is becoming more commonplace in the industry to enhance the predictive power of catastrophe models.

Modeling actuaries can agree that more granular data is always better. But in a time when collecting more and more consumer-level data is becoming increasingly taboo and risky, how can we influence the public to willingly hand over more personal data to insurance companies? Kunst and Williams believe that educating the public is key to ensuring that consumers understand that more accurate catastrophe modeling and pricing is a "win-win-win" for the individual, insurers and society. If we can effectively illustrate to consumers the accuracy of models in predicting insurance needs at the individual home level, then we can articulate that we'll be able to offer better protection in their times of need. The ultimate effect would be that consumers would see less subsidization, more fair insurance pricing and a far more stable insurance market. ●

Jourdan Vasapolli, ACAS, is lead actuary at USAA and a guest columnist for AR.

Live Pricing: Speed To Market in the Digital Age

By DAVID IDOUX

The P&C marketplace is intensely competitive. According to the 2024 NAIC Market Share Report, the top 10 P&C companies command approximately half the total market share. Market competition is even more fierce in personal lines, where the top 10 market leaders control 76% of the private passenger auto marketplace and 62% of the homeowners marketplace. As a result, insurers are always scanning the horizon, searching for the next big wave to ride to greater heights. At the 2025 RPM Seminar in Orlando, "The Pricing Evolution: From Offline to Live Rating" session made the case for live rating as the next great opportunity for insurers looking to reach new heights in pricing sophistication and speed to market.

The session was presented by Damiano Massimi and Jacopo Marchesan, ACAS, both from Munich Re, along with Klayton N. Southwood, FCAS, as moderator from WTW. The following is a summary of their work.

First, how did we get here? A critical insight into this pricing journey is to observe that discovery and adoption of algorithms in insurance pricing are two different things. GLMs were discovered in 1972, but it took until the mid-to-late aughts for GLMs to become widespread in insurance pricing. The key drivers of this adoption were the mass digitization of insurance data and the advent of cloud computing. As the amount of data available to train models exponentially increased from 2010 to 2020, the predictive power of these algorithms accelerated. But merely having a wealth of data isn't enough — modelers still require the resources to fit their models in a timely manner. Thus, the proliferation of cloud computing was key in providing the computational resources necessary to hasten the model development cycle. These two forces in tandem created the modern GLM, which is now the gold standard of insurance pricing.

In today's marketplace, insurers face three key challenges that are in tension with one another: market competition, innovation demand and regulatory compliance. Particularly in personal lines, market competition forces both new and established insurers into aggressive pricing strategies. Consumers expect strong customer experiences and innovative products. This tension puts pressure on insurers to have an agile and forward-looking mindset if they seek to grow profitably. At the same time, insurers also need to adhere to diverse and evolving regulatory requirements. This overhead increases the operational cost of the product, particularly if the company seeks to gain approval for innovative ideas.

While live rating lacks a universally accepted definition, there are some common attributes that can guide insurers. Live rating platforms should be sophisticated in their real-time calculation capabilities and should be seamlessly integrated into the company's broader technology ecosystem. These features allow for real-time, accurate quotes to be generated through a streamlined user experience, utilizing the latest and greatest machine learning algorithms available to actuaries. Efficient integration into the company's systems enables on-the-fly adjustment and deployment of rating factors, enabling insurers to quickly adapt to changes they are seeing in the marketplace. Furthermore, this framework allows for the ongoing monitoring and refitting of pricing models, perhaps on a daily or even hourly cadence.

Traditional end-to-end pricing frameworks typically involve a couple of handoffs. First, the pricing team develops their models and rates in their analytical environment and then hands off their decisions to IT for implementation into their policy administration system (PAS). From here, IT would take those models (or model output) and program the components of the rate order calculation into the rating engine. Then application programming interfaces (APIs) connect to the PAS and enable customers to interact with the front end (e.g., a website). These handoffs are usually very slow due to the necessity for IT to program the changes, and they're prone to error. In some cases, pricing models need to be simplified to meet the technological requirements of the rating engine.

A live pricing framework would change this paradigm by bringing the rating engine directly into the analytical pricing environment, controlled by the pricing team. This change eliminates the need for a handoff and enables the pricing team to deploy new rates or pricing models independently, without the need for IT or other outside assistance. Then, the rating engine can be connected directly to the digital front-end through APIs. This framework allows the pricing team to do things that were previously difficult when reliant on IT resources. For example, traditional frameworks may require combining sub-coverages into a single model due to PAS resource constraints. This modern framework more easily enables multi-year projections or shifting away from Frequency/Severity models to more complex models such as GBMs, GAMs or even deep learners.

With the pricing team's ownership of the rating engine, more sophistication in pricing can unlock new insights. Different types of models can enable more accurate or nuanced pricing strategies. Stepping beyond a point-in-time view of pricing, actuaries can start to build simulations of future customer behavior. Modeling of price elasticity, competitive intelligence and multiyear projections allow the actuary to build more sophisticated lifetime value analyses, which can be optimized for a target function (such as profit or retention), constrained on metrics of interest (e.g., loss ratio), over a long-term time horizon. By producing many different simulations that can be compared against one another, the actuary and relevant stakeholders can get more insight and precision in their pricing philosophy. Furthermore, by owning the rating engine, actuaries can construct a continuous and automated process whereby models are trained, deployed, monitored, retrained and redeployed automatically as new data is gathered.

The pace of technological change in our society is staggering. While the challenges that we face as actuaries are numerous, the road ahead demands speed, sophistication and thoughtfulness.

The pace of technological change in our society is staggering. While the challenges that we face as actuaries are numerous, the road ahead demands speed, sophistication and thoughtfulness. As such, it's more critical than ever for insurers to take a hard look at their broad technological ecosystem and look for efficiency gains. The leaders of the future will be the ones who develop agile processes that balance technological priorities, such as complexity and precision, with more human qualities, like a seamless user experience and personalized product offerings. ●

David Idoux is an actuary lead at USAA and is a guest columnist for AR.

Improving Telematics with Driver Education By MARTIN ELLINGSWORTH

"A car year is not a great attribute for accurate driving information…"

— Actuarial Yoda

Moving from a car year to continuous observation of driving behaviors and incorporating live-action accident response set the stage for the session, "Improving Telematics with Driver Education," presented by Robert Zolla FCAS, MAAA; Sam Chiu, B.S., MBA, Psy.D; and Bill Costa, FCAS, with Nickolas A. Alvarado FCAS, CSPA, MAAA, serving as moderator at the 2025 RPM Seminar. The following is a summary of the session as presented by this panel.

Turning all this data into personalized, instructional design for creating safer driving experiences for every driver is the goal. Along the way, rewarding better driving with more accurate and better ratemaking just makes sense.

Traditional insurance windows on the driving world are opaque. They aggregate multiple trips across days and weeks of actual driving experience to single units of observed risk data across time rolled up to a car year level of analysis. Even with a full policy period completion, typically six months or 12, we simply count claims — zero mostly, then one, two, etc. Some policies end early. Some vehicles are taken off the road. Frequency and severity pile up across a time-based contract exposure period.

From that, we make informed guesses, but I prefer the term predictions.

In order to attempt to predict what might happen in the next future period, we make assumptions. We make assumptions on the amount of driving since time is not the only consideration. We make assumptions on where, when, and who will be driving. We absolutely make assumptions on "how" we anticipate the policyholder to go about their driving. We have parameterized a bit with prior information that drivers with more experience may avoid situations and accidents due to their road awareness (age is not a perfect metric, especially if not allowable in rating, or as young drivers delay getting their licenses, but generally, we expect due to driving experience, those with more experience have higher awareness of what safe driving means in the context of the driving situations they encounter).

We create an economic behavioral conditioning — better driving, better price. But, with so little to go on, we

From left to right: Sam Chiu, Nicholas Alvarado, Robert Zolla, Bill Costa often feel we are driving the ratemaking process with our eyes wide shut.

What if we could open our eyes by seeing through the eyes of our drivers using modern data from a digital lens?

This session posed and answered these questions.

The forward momentum of telematics has evolved to a spectrum of data points and streams that can re-create the rhythm and motion of any vehicle in any circumstance. Sometimes including full-action video.

When a time-blocked contract is now seen in the context of driving situations across every driving moment, we can potentially observe the "why" of every accident. Those insights can match rate to risk with massive new segmentation. In addition, we can turn our data-driven insights about adverse events into likely avoidable scenarios that drivers can learn to recognize and learn to react to. This will influence the likelihood of future claims in a downward trajectory, which is good for everyone.

Better driving habits could be instilled with education using driving simulators (like a pilot in a flight simulator) to turn "why did an accident occur," into "why not?" Teaching driver awareness for understandable risks will help prevent accidents. By teaching drivers how to anticipate "why" they may soon be in a predicament, they can learn to avoid them.

It is just so much easier to stay out of trouble when driving, than to get out of trouble after it occurs.

Driving too fast for conditions, being unable to see clearly at night, using bright lights, dealing with congestion, weather, narrow roads, construction, etc. Following too closely. Misjudging distances and speed. Failure to obey rules of the road, signs, lights, and instructions. Or simply being distracted while in charge of operating thousands of pounds of moving machinery. These are just a sample of the ways drivers get themselves into dangerous situations

The key to creating a learning path is to think like a psychologist. Is there a treatable behavior that can be observed and changed? (Such as all of those mentioned in the paragraph above.) We learned that we could teach a skill set — defensive driving — that can keep you safe by learning how to stay out of a risky situation that is both recognizable and readily anticipated.

Using modern data streams of connected people with connected cars, telemetry information, whether streaming or in observational buckets tallied by time, distance, road base or trip segments gives us new data and insights to measure driver behaviors while driving. The obvious ratemaking, underwriting and pricing actions swirl in our imaginations. The speakers gave concrete examples to consider adopting for ourselves, our families, customers, and prospects.

Most importantly, we learned that drivers could learn how to learn. In a fantastic revolution based on this realization, automotive engineers and safety software programmers are fusing technology across multiple onboard sensing systems that can now enact sense-and-respond maneuvers automatically and autonomously. When the car keeps you out of trouble, that creates a new segmentation on accident avoidance, but new car features drift into the fleet of vehicles in operation in a decades-slow penetration process. All insurers can do is track those specifically equipped different vehicles according to their own desired vehicle-personalized rate accuracy and underwriting appetite.

The best drivers set the example, and instructional design with realistic driver-eyes in a digital twin driving world can let everyone else be like them or at least make fewer mistakes. Training is not just for human drivers, so the vehicle sense-and-respond systems are equally trainable with these same gathered knowledge and simulations. And that goes for every contraption conveying people — bikes, boats, motorcycles, etc. Add in every commercial vehicle and conveyance, too.

Telematics with evolving levels of fidelity in signal can see the behaviors in context to driving situations, and education and incentives can nudge drivers (and machines) along a path of continuous improvement. These are given strong positive reinforcement with rewards, recognitions, objective functions and driver/vehicle ratings that help drivers incorporate the feedback into habit.

Matching the right situational awareness to the right roadway situations enables drivers to learn a risk and safety mindset to avoid trouble or at least mitigate the effects where possible when trouble is unavoidable. Identification of what needs to change, communication targeting that improvement and maintenance of changes in behavior is the path to progress.

Combining safer vehicles with safer drivers has an outsized effect on making safer roads and lower rates. That's something worth learning. ●

Martin Ellingsworth is the president at Salt Creek Analytics. And a big thank you to Rachel Hunter for peer editing.

Actuaries Play a Pivotal Role in IFRS 17 Adoption

By STEPHEN DONG, CATHY CHANG, SILGY TIAN, DELVIN CAI, YEW KHUEN YOON, CHONG YONG YAP AND GUNDGANID SINGHAVILAI

The views reflected in this article are the views of the authors and do not necessarily reflect the views of the global PwC organization or its member firms. The information contained in this publication is of a general nature only. It is not meant to be comprehensive and does not constitute the rendering of legal, tax or other professional advice or service by PwC.

For the international insurance market, the transition to International Financial Reporting Standard 17 (IFRS 17) from IFRS 4 is one of the most impactful events in the industry's history. This change applies to insurance companies reporting under IFRS — 168 jurisdictions worldwide.

IFRS 17 strives to improve the transparency of insurers' financial statements and makes insurance reporting more consistent across jurisdictions. The previous IFRS 4 rules could deviate significantly among neighboring markets (for example, in Europe/Asia).

However, IFRS 17 is still a principle-based standard and therefore has many areas that require management judgment. Actuaries are increasingly involved in the decision-making of these accounting policies and the ongoing setting of financial reporting assumptions.

In this article, we will focus on the pivotal role played by the P&C actuaries in the IFRS 17 transition. We will explore how this accounting standard change helps to untap the future capability of actuaries in the engine room for financial reporting and business planning.

First, we will get familiar with the IFRS 17 by understanding its impact on the P&C insurers' top line and bottom line. Second, we will dive into the working language of IFRS 17 and how it helps to reshape the P&C business key performance indicators (KPIs) and enhance reporting intelligence. Third, we will explore opportunities for P&C actuaries to modernize financial reporting and planning based on IFRS 17 foundation and challenges to be mindful of.

Our viewpoint from the Asia market:

You may appreciate the difficulty to generalize trends for the "international insurance market." Our study is based on our Asia market IFRS 17 work experience across Hong Kong, Shanghai, Singapore, Kuala Lumpur and Bangkok.

Our study is supplemented by an industry survey on over 60 P&C insurers in territories that have already gone live with IFRS 17, including Hong Kong, Singapore and Malaysia.

We are also preparing a research paper named "Actuarial Considerations Associated with IFRS 17 Implementation for General Insurers in Asia." We look forward to presenting its Part 1 at the CAS Spring Meeting in Toronto.

What is the IFRS 17 impact to the P&C insurers' top line and bottom line?

Based on our observations in the Asia market, the IFRS 17 adoptions produce generally positive impact to P&C insurers' top line and net equity and often muted impact to the bottom line. The direction and magnitude of change would still vary by markets, as each local IFRS 4 sets a different starting point.

Here we will focus on the commonly observed trends as illustrated in Chart 1.

Top Line: The driver for the revenue increase is straightforward — IFRS 17 recognizes the insurance service revenue on the gross basis, and the ceded reinsurance premium is not deducted from the revenue. We will come back to the treatment of reinsurance in the next section. There are other factors that also impact the revenue, especially for reinsurers.

Bottom Line: The bottom line/underwriting profit doesn't see significant impact compared to the life insurance counterpart. Life insurers tend to see acceleration or delay of profit recognition during their longer-term product cycle. One exception for the P&C side is when the interest rate fluctuates significantly, the bottom line would be impacted.

Net equity: The drivers for the net equity increase are most interesting — below we highlight the main factors for the P&C side (Chart 2):

Discounted cash flows: IFRS 17 applies discounting on claims and premium liability cash flows. Discounting under IFRS 4 is often optional, so the new change tends to reduce the reserve liabilities.

Deferred acquisition cost (DAC): IFRS 17 DAC includes costs directly related to business acquisition (similar to the U.S. Generally Accepted Accounting Principles, or GAAP). DAC under IFRS 4 is often limited or not required, so the new scope allows additional cost deferral and reduces the reserve liabilities.

Chart 1

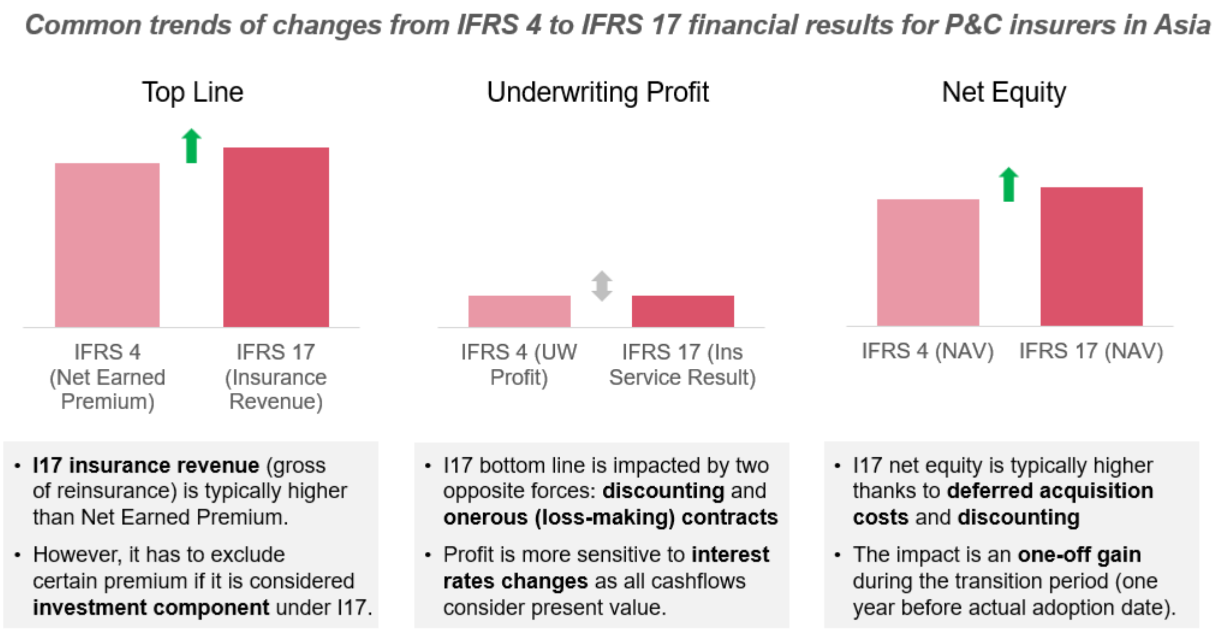
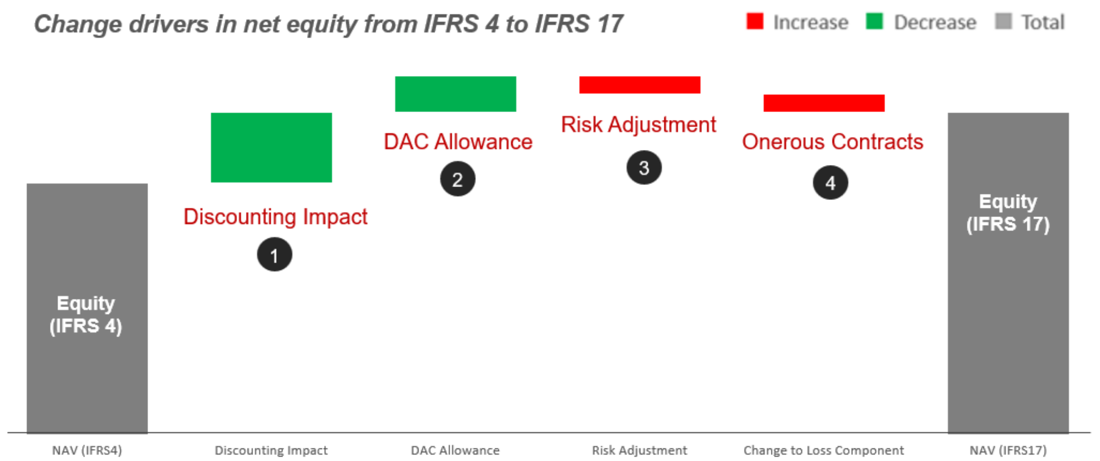


Chart 2



Risk adjustment: IFRS 17 applies risk adjustment to reserves (unlike the U.S. GAAP). As many markets under IFRS 4 have already adopted risk adjustments, the impact is less material.

Onerous contracts: IFRS 17 advocates insurers to assess profitability of insurance portfolio at more granular level and prudently set aside deficiency reserve for those loss-making groups. This tends to strengthen the reserve liabilities.

We will provide a comprehensive tour of the full list of factors in our upcoming paper "Actuarial Considerations Associated with IFRS 17 Implementation for General Insurers in Asia."

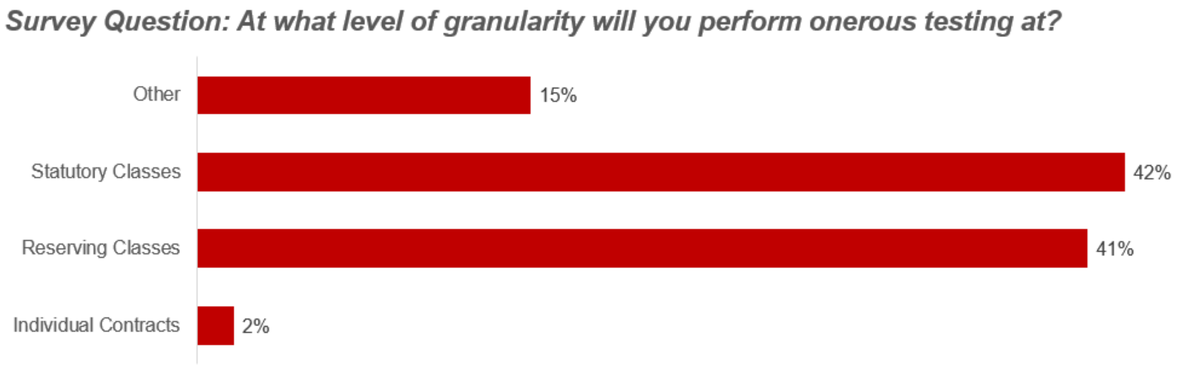
How does the new language of IFRS 17 help to enhance the P&C KPIs?

While the outcome changes in the previous section offer plenty of food for thought, it is just the tip of the iceberg. In this section, we will dive into the mechanics of IFRS 17 financial reporting, introduce the "unit of account" concept and explain why P&C actuaries are becoming more embedded in the reporting roles.

Unit of Account for P&C

The measuring units in the language of business, finance and actuarial functions used to be different, probably best demonstrated by the definition of a "year": policy year versus financial

Chart 3



year versus accident year. As the year's definition embodies different exposure and liabilities, it is inherently difficult to align the measurement on the business performance.

IFRS 17 helps to address this challenge by adopting a unit that could be shared among functions. IFRS 17 requires insurers to organize insurance contracts into groups according to three criteria:

- Product portfolio subject to the same risk type and managed together.
- Degree of profitability.
- Year of issue.

Each group is assessed for its liabilities related to incurred claims (claims liabilities) and remaining coverage (premium liabilities). Actuaries thus need to produce reserve estimation at the more granular level.

To meet this grouping requirement, we found P&C insurers in practice have commonly adopted the following approach:

Product portfolios largely follow the existing product line structure, split into direct/assumed/ceded (if assumed is immaterial, combined direct and assumed). This helps the local industry to set a comparable framework.

Within a major product line, several product subgroups are divided if they operate differently and vary in profitability (such as online versus traditional, social welfare versus supplementary). This is where individual insurers customize their grouping. An agriculture insurer and a personal line insurer may have different groupings.

All groups of contracts are divided by year of issue. This last step represents a critical step up in granularity as it pushes P&C financial and actuarial reporting to integrate with the business viewpoint in policy year.

minimum breakdown of product lines, while the insurer's own reserving class represents the company's own management approach.

We found larger insurers and specialty insurers have a tendency to seek more granular groupings, which represent the 15% cohort.

Some P&C reinsurers choose to model cashflows at the individual treaty level, which represent the remaining 2% (it is also common for direct insurers to treat outward reinsurance at individual treaty level, if not bundling similar treaties into one group).

Within a major product line, several product subgroups are divided if they operate differently and vary in profitability (such as online versus traditional, social welfare versus supplementary). This is where individual insurers customize their grouping.

Our Asia survey (Chart 3) found the following trends:

42% of respondents perform profitability testing at the local statutory class level, while 41% of respondents perform it at the reserving class level. The local statutory class typically represents the

The "five fingers" responsible for the P&L

Based on the granular unit structure above, we are able to reconstruct the P&C business profit and loss statement (P&L). The changes could be captured on the high level in the comparison

Chart 4

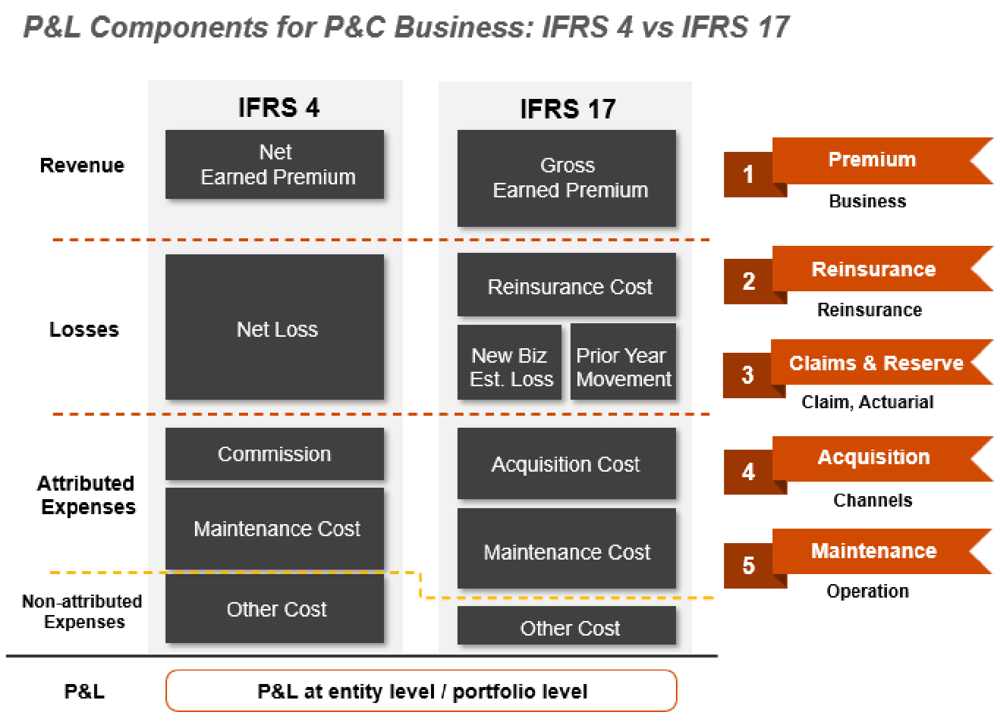


Chart 4.

Under IFRS 17, the P&C insurance P&L consists of five key components, as illustrated in Chart 4. We compare them to "five fingers" of the hand that controls and monitors the P&L. Specifically:

Gross Earned Premium: Revenue measure uses gross-basis premium (including direct & assumed) instead of net, which is comparable to the "gross income" concept common in other industries. Gross earned premium is closely associated with growth KPI.

Net Reinsurance Cost: Ceded reinsurance revenue, reinsurance commission and loss recovery are put in the same bucket to assess the net cost (or gain) of an outward reinsurance contract. In essence the insurer is paying for a financial service for risk mitigation/surplus relief purpose.

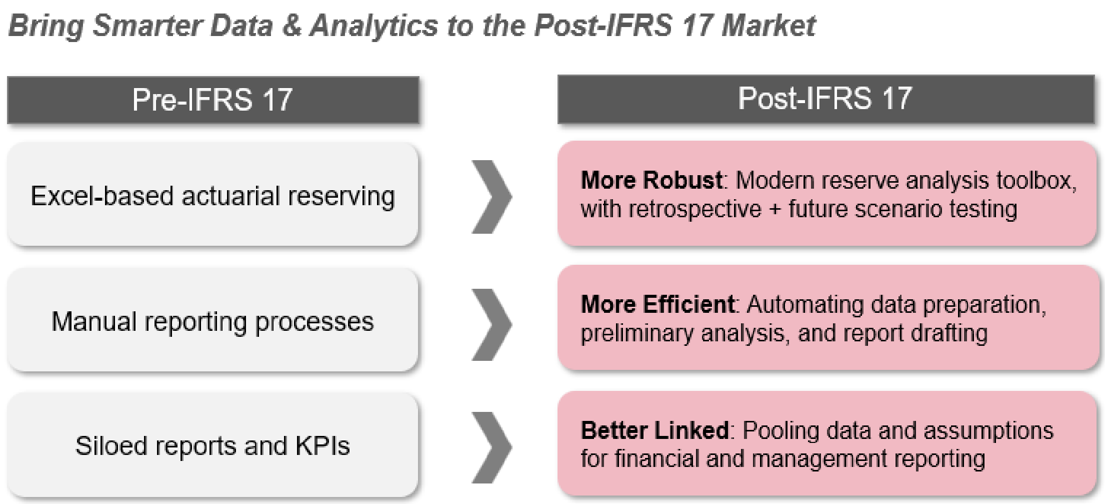
Claims and Reserves (old vs. new): Estimated claims development for new business (current policy year) are separated from the reserve movement for old business (prior policy years). This setup brings an actuarial reserving viewpoint into financial reporting, highlighting the tie between reserve movement from older accident years and current year P&L. However, this also brings closer scrutiny to historical reserve accuracy.

Acquisition Cost: As discussed in the previous section, this item captures the costs directly related to business acquisition, allowing DAC along with the direct insurance revenue earning.

Maintenance Cost: This item captures all the costs related to insurance service other than business acquisition. More importantly, maintenance cost also needs to be attributed to individual groups of contracts, just like acquisition cost. This requires a more robust process to allocate all the mid/back-office expenses to the front line (except for the costs not attributed to insurance ser-

The "five fingers" represent not only five distinctive P&L components, but also five interconnected functions/departments responsible for running the P&C business. business. Each finger tends to act in silo, but under IFRS 17 the five of them have potential to act in unison, as one hand.

Chart 5



vices). This approach is comparable to "zero-based costing" in other industries.

In summary, the "five fingers" represent not only five distinctive P&L components, but also five interconnected functions/departments responsible for running the P&C business. Each finger tends to act in silo, but under IFRS 17 the five of them have potential to act in unison, as one hand.

When the financial result deviates from the budget, we could effectively identify "which finger to point" (no pun intended) and which team should be responsible for leading the problem solving (claims deterioration, unexpected reserve release, reinsurance cost pressure, service cost inflation, etc.).

During this IFRS 17 transformation, more measurement and modeling components are introduced to financial reporting. As a result, actuaries are becoming better positioned to analyze the financial report and cross-examine the change drivers.

What are the opportunities and challenges for P&C actuaries to modernize financial reporting and business planning under IFRS 17?

There is still work to do post-IFRS 17. With the improved data foundation and shared terminology under IFRS 17, we see P&C actuaries play a bigger role in modernizing insurance financial reporting and business planning.

Smarter data and analytics

In Asia, many smaller insurers used to rely on manual or semi-manual reporting processes, and different departments often act in silo to produce regulatory and management reports. The IFRS 17 implementation journey has ushered in a major leap to the insurer's state of data, systems and processes.

Post IFRS 17, smarter data and analytics would be essential to empower the more sophisticated reporting and planning. We believe P&C actuaries could actively contribute to such capability building in three ways (Chart 5):

More Robust: Modern reserve analysis toolbox, equipped with supporting functions such as retrospective testing and future scenario testing.

More Efficient: Automating data preparation, preliminary actuarial analysis and report drafting to free up the team's time to carry out deep-dive investigation.

Better Linked: Pooling data and assumptions to provide a consistent basis for various financial and management reporting.

Deeper interconnectivity within reporting modules

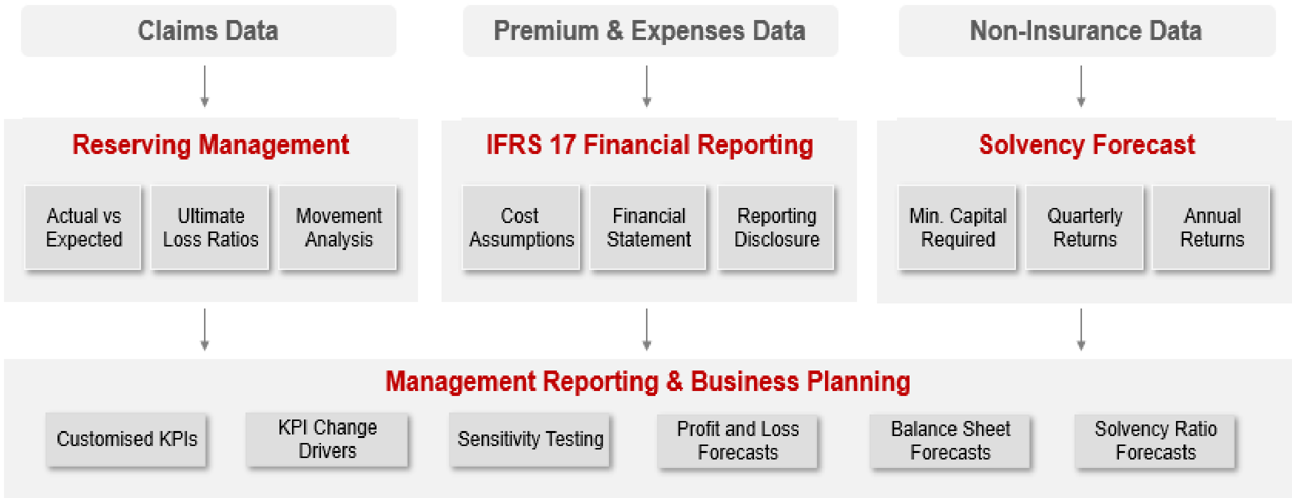
When exploring how to effectively take on the task of improving future reporting, we also took a step back and looked at the work required holistically. We have identified a stronger connection among reserving, P&L, solvency, management reporting and business planning post IFRS 17.

The chart below illustrates the flows of data, assumption and outcomes among these modules (Chart 6).

There is no coincidence that actuaries are playing a role in all of the four modules (in non-IFRS 17 markets, the dynamic still holds). Actuaries in reporting roles should always keep an eye on opportunities to improve the intercon-

Chart 6

Interconnectivity Among P&C Reporting Modules



nectivity and consistency among these modules to make a more meaningful difference.

Challenges ahead

While there are exciting growth opportunities for P&C actuaries in the post-IFRS 17 markets, we should also pay close attention to the challenges ahead, both on the technical and managerial level:

P&C actuaries need to produce reserve estimation at the more granular level, such as for allocating reserve of a product portfolio into policy years.

Actuaries face closer scrutiny on reserving accuracy, since the IFRS 17 financial report now discloses movement of historical reserve.

Actuaries interested in IFRS 17 modernization work need to become proficient with insurance accounting concepts and financial reporting workflows.

Actuaries need to become proficient with the system design and data workflow of key modules including policy admin, expense management, reinsurance, accounting and payment, subledger and general ledger, etc.

Actuaries need to continue improving our communication skill set, enabling us to collaborate design with the finance team and to translate complex financial/actuarial /data concepts for senior management.

IT’S A PUZZLEMENT By JON EVANS

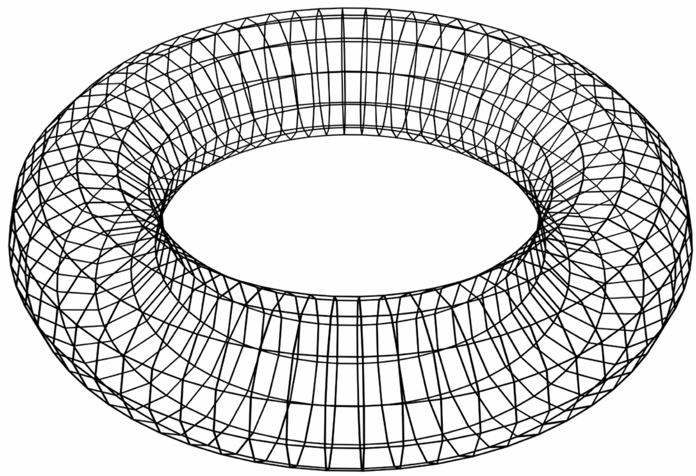
Random Walking on a Hyper-Torus

Imagine a three-dimensional toroidal lattice where each point is defined by coordinates (x, y, z), and each coordinate is an integer from 0 to 19. A particle inhabits this lattice and moves every second. In each of the three dimensions every second it steps either +1 or –1, each with probability 1/2. These movements are entirely independent across dimensions, so at each step, the particle’s position changes by (±1, ±1, ±1), with all sign combinations equally likely. The lattice wraps around like a torus: moving +1 from 19 takes you to 0, and moving –1 from 0 takes you to 19, all modulo 20.

Suppose the particle begins at the position origin (0, 0, 0).

- What is the probability that it never returns to the origin?
- What is the average time (expected number of steps) until it first returns to the origin?

Now answer these same two questions supposing the particle starts at some other point distinct from the origin.



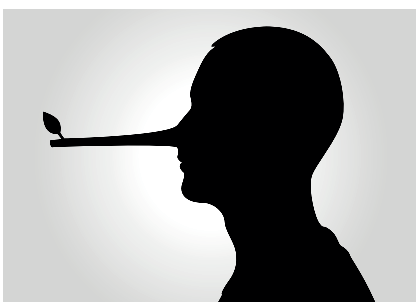
How many liars?

At a conference of logicians, five attendees (A, B, C, D and E) are each either a truth teller (always telling the truth) or a liar (always telling lies). They make the following statements:

- A says, “Exactly one of us is a liar.”
- B says, “Exactly three of us are truth tellers.”
- C says, “Exactly three of us are liars.”
- D says, “Exactly one of us is a truth teller.”
- E says, “All five of us are liars.”

How many liars are there among the five attendees, and who are the liars?

E’s statement implies that E is a liar and there is at least one truth teller. D’s statement is true only if D is the only truth teller. That is consistent with A, B, and C’s statements being false and them all being liars. So only D being a truth teller and the other four being liars is consistent. The statement by A cannot be true as it would make both B and C liars. The statement by B cannot be true as it would make A, C and D liars. The statement by C cannot be true as it would imply A, B and D would be liars, in addition to E being a liar. Therefore, D being the only truth teller is the uniquely consistent solution.



Solutions were also submitted by Daniel Aarhus, Eli Blum, Krishna Chakravartula, Bob Conger, Athanasios Dafulas, Helen Davidson, Stephanie Dobbs,, Y. Ephrathi, Samantha Glover, First Last, Eamonn Long, Edwin Lopez, Juan McNamara, Jonas Meyer, Jerry Miccolis, Ron Miller, Jim Muza, John Noble, Hannah Park, Alan Putney, Misha Rajcoomar, Brad Rosin, Michael Schwalen, Gregory Scruton, Emily Sledge, Clinton Sornberger, David Spiegler, Bob Spitzer, Jeff Subeck, Betty-Jo Walke, Logan Webb and Paul Zotti.

Know the answer? Send your solution to ar@casact.org.

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