The Actuarial Review

THE NEWSLETTER OF THE CASUALTY ACTUARIAL SOCIETY • VOLUME 35, NUMBER 1 • FEBRUARY 2008

The Top Ten Casualty Actuarial Stories of 2007

—By Vince Yezzi and Christina Gwilliam—Once again, CAS thought leaders have been surveyed to identify the ten most significant news stories affecting the casualty actuarial profession. 28

From the President: The Times They Are A-Changing—

By Christopher S. Carlson—In case you were wondering, your latest copies of the *CAS Forum* and the CAS *Yearbook/Proceedings* have not been lost in the mail. 3

Members Support Increased ERM Education: MAP Survey Results Provide Insights

—By Kevin Dickson, CAS Vice President-ERM—Over the last several years, the CAS has sought to prepare its members for opportunities within the growing field of Enterprise Risk Management (ERM) and has undertaken many activities to this end. 15

The Book Shelf: Quality Control for "The Information Factory"

—Reviewed by Gregory Scruton—In David Loshin's *Enterprise Knowledge Management*, the author likens the flow of data within an organization to the assembly process in a manufacturing plant, often referring to an organization's data production as "the information factory." 13

Random Sampler: ERM Perspectives

—By Wayne H. Fisher—Timing is everything and these are exciting times for chief risk officers...You can't open a newspaper these days without mention of a firm's ability or, all too frequently, its inability to manage its risk. And that's where we can step in. We're the risk people! 35

CAS Member Attains Both FCAS and FSA at Age 27 24

INSIDE THIS ISSUE

CAS President Tom Myers is flanked by brothers Kenneth and James Leonard (left and right, respectively). The two brothers were among 138 new CAS Fellows who were honored at at the 2007 CAS Annual Meeting in Chicago last November. For more on the Leonard brothers, see page 20.

The Actuarial Review is the quarterly newsletter of the Casualty Actuarial Society.

Editor in Chief
Paul E. Lacko

Managing Editor
Elizabeth A. Smith

Publications Production Coordinator
Donna Royston

Desktop Publisher
Grace V. Vida

Editor Emeritus
C.K. "Stan" Khury

Editor Emeritus
Matthew Rodermund

Associate Editor
Martin Adler

Copy Editors
J. Parker Boone
Min Jiang
Allan A. Kerin
Leslie R. Marlo
Wendy W. Peng
J. Dale Reynolds
Eric L. Savage
Arthur J. Schwartz
Bryan G. Young
Nora J. Young

Book Review Editor
Douglas W. Oliver

Humor Editor
Michael D. Ersevim

Nonactuarial Pursuits
Martin Adler

Puzzle
John P. Robertson

Reporter
Leslie R. Marlo

U.K. Correspondent
Jonathan Bilbul

The Actuarial Review (ISSN 10465081) is published four times each year by the Casualty Actuarial Society, 4350 North Fairfax Drive, Suite 250, Arlington, Virginia 22203. Telephone: (703) 276-3100; Fax: (703) 276-3108; E-mail: office@casact.org. Third class postage is paid in Lanham, Maryland. 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 *The Actuarial Review* is $10. Subscriptions to nonmembers are $10 per year. Postmaster: Send address changes to *The Actuarial Review*, 4350 North Fairfax Drive, Suite 250, Arlington, Virginia 22203.

For permission to reprint material from *The Actuarial Review,* please write to the editor in chief. Letters to the editor can be sent to AR@casact.org or the CAS Office. The Casualty Actuarial Society is not responsible for statements or opinions expressed in the articles, discussions, or letters printed in *The Actuarial Review*.

© 2007 Casualty Actuarial Society.

CAS Trust Scholarships Open For 2008–2009

Funded by donations to the CAS Trust, the CAS Trust Scholarship program awards up to three $1,500 scholarships to deserving students annually. The intent of the scholarships is to further students' interest in the property/casualty actuarial profession and to encourage pursuit of the CAS designation. The CAS Trust Scholarship Subcommittee, chaired by Alice Underwood, chooses recipients.

If you know students interested in pursuing careers in actuarial science, encourage them to apply. For more information, visit http://www.casact.org/academic/index.cfm?fa=scholarship. Completed applications for the upcoming year are due May 1, 2008.

Established in 1979, the Casualty Actuarial Society Trust affords CAS members and others an income tax deduction for funds contributed and used for scientific, literary, or educational purposes. AR

D.W. Simpson Makes CAS Trust Donation

The Trustees for the CAS Trust (CAST) are pleased to announce that D.W. Simpson & Company donated $10,000 to the Trust in October 2007. This brings the total contribution of the D.W. Simpson & Company to the Trust to $120,000 over the past several years. The CAS sincerely thanks D.W. Simpson & Company and its employees for this milestone contribution toward advancing actuarial science. AR

The Times They Are A-Changing

In case you were wondering, your latest copies of the *CAS Forum* and the CAS *Yearbook/Proceedings* have not been lost in the mail. As the Internet and electronic publishing have become a routine part of our daily lives, the CAS has introduced the E-Forum, which will replace the traditional paperback *Forum*. And the information included in the CAS *Yearbook/Proceedings* will now be available only online via the CAS Web Site.

Call me old school but I, for one, will miss the appearance of the *Forum* in my mailbox. We are moving from a world where the CAS "pushes" information to our members via the postal service to one where more and more the members need to "pull" the information from the Web Site. This change may result in some of us overlooking a research paper or two along the way. These papers are those that we have occasionally run across when that light blue paperback copy of the *Forum* arrived. We will all need to be more aware of the many educational and research-related items available on our Web Site and learn to review in more depth the weekly e-mails from the CAS Office.

"We are moving from a world where the CAS "pushes" information to our members via the postal service to one where more and more the members need to "pull" the information from the Web Site."

This need to remain aware of available information is now more important than ever. As a result of the new Qualification Standards approved by the American Academy of Actuaries Board of Directors, nearly all CAS members who perform actuarial work in the United States are now making statements of actuarial opinion (not to be confused with Prescribed Statements of Actuarial Opinion such as Loss Reserve Opinions). Furthermore, as of January 1, 2008, effectively all U.S. actuaries are subject to the expanded continuing professional development (CPD) requirements. It is essential to fulfill these requirements in order to remain qualified to practice in the U.S. The revised Qualification Standards apply whether you are a dues-paying member of the American Academy of Actuaries (AAA) or not. (Please refer to the AAA Web Site for specific details.) Our members practicing in Canada and those who have been making Prescribed Statements of Actuarial Opinion in the U.S. are already accustomed to this process.

For members practicing exclusively outside the United States, please don't feel left out of the discussion. A task force of the CAS Board is currently studying the question of whether to maintain the historical practice of requiring members to comply with the CPD requirements, if any, of the local authority in their geographical area of practice (e.g., the AAA or CIA) or establish CPD requirements for all CAS members.

In order to meet the revised U.S. and other jurisdictional CPD standards, CAS members can search the CAS Web Site for papers and documents related to their areas of practice or to other practice areas, including the emerging practice areas. Our Web site contains a wealth of educational information. There are also links to many other sites useful in locating educational material, including sites of the Institute and Faculty of Actuaries, the Institute of Actuaries in Australia, and the *ASTIN Bulletin*. I would be remiss if I failed to mention *Variance*, the new peer-reviewed journal of the CAS, available at www.variancejournal.org. It is important to remember that your CPD hours need not come solely from organized events. Self-study hours earned by reading research papers and educational materials are allowed and encouraged in meeting the CPD requirements.

So, welcome to the "pull technology" world and the revised U.S. Qualification Standards. Becoming accustomed to one can help you fulfill the other! AR

An ASB Overstep

Dear Editor:

Although I view Actuarial Standard of Practice (ASOP) No. 43 as both important and necessary, I believe that the Actuarial Standards Board (ASB) has overstepped in one area. That is, in Section 3.1.1 of Introduction to the Actuarial Standards of Practice (http://www.actuarialstandardsboard.org/pdf/asops_intro_dec04.pdf), the purpose of ASOPs is defined as follows:

The ASOPs are not narrowly prescriptive and neither dictate a single approach nor mandate a particular outcome. ASOPs are intended to provide actuaries with a framework for performing professional assignments and to offer guidance on relevant issues, recommended practices, documentation, and disclosure. Each ASOP articulates a process of analysis, documentation, and disclosure that, in the ASB's judgment, constitutes appropriate practice within the scope and purpose of the ASOP.

However, Section 3.6.1 of ASOP No. 43 (http://www.actuarialstandardsboard.org/pdf/asops/asop043_106.pdf) states the following:

> If for any material component of the unpaid claim estimate the actuary does not use multiple methods or models, the actuary should disclose and discuss the rationale for this decision in the actuarial communication.

In this sentence I believe that the ASB has crossed the line into the "narrowly prescriptive." The selection of methods, models, and assumptions should be the responsibility of the individual practitioner. Moreover, the ASB is now requiring actuaries to document the non-use of more than one method. Requiring the justification of a negative is nonsensical. In theory, there are a nearly infinite number of analytical methods that could be used to perform a sound actuarial analysis of the same data. So why stop (arbitrarily) at the use of two methods—why not four, six, or ten?

Furthermore, I definitely have a "slippery slope concern" here, as this argument could be extended to the determination of assumptions. If we allow this to persist and become precedent, the ASB could require actuaries to document why they did not develop trend estimates based on more than one fitted model or loss development factors based on both arithmetic and stochastic methods. Is this really what we want or need from the ASB?

This letter reflects my personal view and not necessarily those of my employer.

—Rajesh Sahasrabuddhe, FCAS, MAAA

"Recent Developments" Are Preliminary

Dear Editor:

I would like to thank the authors for the time taken to write "Recent Developments in the Treatment of Property and Casualty Insurance Contracts Under Fair Value Accounting" (*Actuarial Review,* November 2007) and their efforts to publicize these issues for the CAS membership. But I am concerned that the article may have misled some readers regarding how definitive these proposals currently are, and the steps required for their eventual implementation.

First of all, the IASB's recent Discussion Paper is accurately titled a "preliminary views" document. It is not a roadmap, but a list of current leanings for various issues. There are even areas where the IASB currently has yet to determine a preliminary view, in which case it is asking for those responding to the draft for their ideas or suggestions. Hence, any proposals in the Discussion Paper should not be taken as firm, irrevocable decisions.

Second of all, the timing is less definitive than readers of the article may be led to believe. The original intention was to produce an exposure draft (i.e., a full draft standard) by 2008, as the article claims, but current bets are that it will be later than that. (The IASB Web Site now lists a target date of 2009 for the exposure draft, more than a year off, with "timing yet to be determined," for the final standard. There is no guarantee that even the extended 2009 target date for exposure draft will be met.)

Third, while the FASB and IASB have clearly advocated for the use of fair value accounting for financial instruments (such as bonds and stocks traded on recognized exchanges), the decision on whether or not to require the same rules for insurance liabilities has not yet been made. The IASB's own Discussion Paper included proposed restrictions on liability measurement that would violate most definitions of fair value. The IASB has clearly proposed the reflection of the time value of money and a risk margin (reflecting the market-required charge for taking on risk) in liability valuation, but it is still open as to whether their final proposal could (or should) be labeled "fair value."

Fourth, while some are interpreting the discount rate as including an adjustment for the insurer's credit standing (which would result in a higher discount rate), many are not. The actual document does not make such a proposal. (The actual document states the liability should reflect the credit characteristics of the obligation, but doesn't say how this should be done, and that it expects it to be immaterial in many cases. It also expects any

such adjustment to reflect the existence of guarantee funds, further supporting a zero credit standing adjustment.)

In summary, while I commend any and all attempts to educate CAS members in this area (and especially make people in the U.S. aware that this is not an "international" proposal, but instead a U.S. standard being developed in London), I caution readers that there is still much uncertainty in this process. The train has left the station on these proposals, but we don't know when the train will arrive or what it will look like.

—Ralph Blanchard, FCAS, MAAA

Authors Gareth L. Kennedy, ACAS, MAAA, and Mellody Mondini respond:

We would like to thank Mr. Blanchard for his comments on our article and for his contribution to the CAS membership's education in this evolving topic. In Mr. Blanchard's response he states that he was concerned our article may have "misled some readers regarding how definitive these proposals currently are," yet he agrees that we have accurately given the title of the IASB's discussion paper as their "Preliminary Views on Insurance Contracts." We support Mr. Blanchard's view that the Discussion Paper is not a road-map, but we do believe it is a North Star giving us a good indication of the direction the IASB is heading.

In the time between when we wrote our article and when it was published, the IASB updated their Web site with a new project time line. Now the IASB states that they do not expect to publish a draft standard before 2009 and do not expect to publish a final standard before 2010. Many observers believe that if this project becomes a joint project with the FASB, the project will take an additional year.

On Mr. Blanchard's third point regarding current exit value and fair value, the IASB states in the Discussion Paper that it "is not yet in position to determine whether these two notions are the same." But the IASB also states that it "has not identified significant differences between them."

Finally on Mr. Blanchard's fourth point we note that an adjustment to the discount rate based on an insurer's credit rating would give some unusual results, which we did not have space to fully explain in our article. We recommend to the interested reader Phillip Heckman's research review in the November 2007 issue of the *Actuarial Review* ("Should Reserves Include Risk Margins?—International Developments") for more on this debate. There is also a third position that this debate is moot because regulatory intervention and the use of guarantee funds would not allow the fair value of claims to be reduced based on credit standing.

At the time of this writing the IASB has received 151 comment letters on their preliminary views. As Mr. Blanchard indicates, the debate is far from over and we strongly encourage other actuaries to become involved in this process.

Eliminate Extra Costs Associated with Educational Meetings

Dear Editor:

Andrew Kudera's November 2007 article, "The Cost of an Education," neglects one obvious way to keep meeting costs at a reasonable level—eliminate some of the functions. A $38 breakfast sounds excessive because it is. I would certainly forgo the breakfast in favor of eating in the hotel restaurant, room service, or some coffee and a pastry from the coffee shop in the lobby. Replacing the open bar with a cash bar at receptions and not having an outside speaker at lunch are cost-saving alternatives to eliminating those functions entirely. Finally, the Tuesday night dinner is both excessive and extravagant. Most employers would have problems reimbursing employees for $150/person meals, and bundling the cost with the registration fee gets it past the accountants but doesn't help travel budgets one bit.

The article makes it appear that these costs are a necessary component of professional education. I attend meetings for the content of the sessions. Eliminating some of the peripheral events with a decrease in registration fees might encourage employers to send more people to the meetings and, after all, isn't that the real point?

—Kevin Burke, Ph.D., CPCU, ARe, AU, ACAS, MAAA

Andrew Kudera, CAS VP-Professional Education, responds:

Thank you for your comments. As mentioned in the article, a task force has been formed to consider changes to the traditional structure of CAS meetings. There are a number of options for keeping meeting costs at a reasonable level, and the task force will certainly consider the suggestions put forth in your letter.

While it would be premature to speculate on potential changes to CAS meetings, I can say for certain that the CAS will be offering several Web-based educational programs in 2008, and this format eliminates food and travel costs entirely. I encourage all CAS members to take advantage of these low-cost educational opportunities. AR

PAUL E. LACKO

At Least The Sky Isn't Falling. . . Yet

Yellowstone National Park is a huge volcano that erupts every 600,000 years or so and dumps a thick layer of ash over half the North American continent. The park has plenty of signs posted that use the word "caldera," and I had read them repeatedly during my visits to the park, but I never bothered to look up the definition of "caldera." According to Bill Bryson's book, *A Short History of Nearly Everything*, the signs were telling me that I was standing on ground that could explode under my feet at any time, convert me instantaneously to a dust cloud, thoroughly blend my molecules into thousands of tons of molten magma, and spread the whole mess across the western U.S. and Canada.

Photo Credit: Cristiano Galbiati

After this bit of information sank in, I began to collect news articles about *other* potential natural catastrophes that lurk just beyond the range of my immediate attention. Global climate change, of course, is the major issue of the century. Most climate models predict that surface temperatures around the globe will continue to rise because of atmospheric carbon, and ocean levels will rise slowly as polar glaciers melt. (Thirty or forty years ago, climate models were warning of global cooling and a new ice age. I guess the climate modelers fixed a few bugs in their models.)

High-priced oil has become worrisome. Sooner or later, all the world's oil will be gone. To date, no one has found any scientifically, politically, *and* financially feasible substitute for oil. (If only we could tap into that "dark energy" that astrophysicists are searching for!)

Global warming and renewable energy are still relatively long-term problems. We have time to search for solutions and adapt to environmental changes. We have other pressing problems in the shorter term.

Fresh water is harder to come by these days, for example. Georgia's drought had the media coverage, but states in the western U.S. are extremely concerned about increasingly scarce fresh water. A recent article in the Sunday *New York Times Magazine* discussed water shortages. What if major reservoirs feeding large metropolitan areas dry up? If the water level in a reservoir drops below the water system's intake pipes, then no more water comes into the water system from the reservoir. What happens if Las Vegas has to turn the lights off? What happens if southern California reverts to dust and tumbleweed, and "California agriculture" is just an oxymoron? When the water is gone, then so are agriculture and electric power generation, both of which require huge amounts of water. People can't live without water, so all those thousands and thousands of people who have migrated to Colorado, Nevada, and Arizona in the past twenty years may soon have to migrate back out again. Where will they go, how will they get there, and what will they do when they get there? What could all this mean to you and your pricing, reserving, underwriting, and marketing strategies?

On an optimistic note, consider that fresh water is plentiful, not scarce—*if* you happen to be in the right place, i.e., where the glaciers are melting, where too much fresh water flowing into the oceans is bad for marine ecology. Water resource planners say that large-scale desalinization has the unacceptable cost of creating an even more intractable problem: what to do with all the salt and minerals? Left on land, this is deadly stuff, so it must be dumped back into the ocean. But dumped right offshore, it will probably kill most of the local sea life. It has to be recycled *somehow*…so transport it south on big container ships, and *pour it into the glacial runoff*.

Problem solved! Next problem: oil won't last forever, so we need an alternative source of fuel for the transport ships. Suggestions, anyone?

Speaking of turning the lights off, I want to quote Robert Lee Hotz's late-September article in *The Wall Street Journal*:

> A moody, middle-aged star, our sun has an explosive temperament… [C]osmic tsunamis of energy periodically have disabled commercial satellites, overloaded power grid transformers, blacked out radio communications and sent space-station astronauts scrambling for radiation shelter. Space weather forecasters are bracing for a new season of intense sunspot activity that could begin in March and peak in 2012… [O]utages and damage could be even greater this time because the world has become increasingly dependent on wireless and cellular electronic networks.

"What happens if Las Vegas has to turn the lights off? What happens if southern California reverts to dust and tumbleweed, and 'California agriculture' is just an oxymoron?"

Inland marine insurers, take note: satellites, communications hardware, and all sorts of electronic data processing equipment are at risk of serious damage during the next ten years, damage much worse than you have ever seen. Servers, GPS devices, laptops, and PDAs could fry. Commercial property actuaries might want to do more than think about the risks of immense solar flares shutting down communications systems and power grids. Maybe it's time to start boosting the risk loads in your inland marine and business interruption rates.

Finally, as we are well into 2008 now and looking to the future, and, knock on wood, we'll all have one, should we be more concerned about the potential impact on the actuarial profession of lawsuits against companies for alleged sins of *omission* as well as alleged sins of *commission*? Company officers and directors may be sued if they knew about certain risks and failed to disclose them, for instance. They may also face costly litigation when someone claims to have suffered damages resulting from risks the company *didn't* know about but allegedly *should* have known. It seems to me that a company that devotes a team of professional experts to uncovering, analyzing, and mitigating risks may be held to a very high standard by shareholders, regulators, and financial analysts. The growth of professional enterprise risk management may introduce or broaden several significant kinds of risk for companies who utilize it. AR

Research Working Party Develops Loss Development Tools

By Robert A. Bear, Co-Chairperson, Loss Simulation Model Working Party

The Loss Simulation Model Working Party (LSMWP) has been charged to create a simulation model of the processes of loss emergence and settlement, commonly known as loss development, that underlie the loss "triangles" and other statistics used to estimate loss reserves. The goal is to create a tool that researchers could use to generate claims that can be summarized into loss development triangles and complete rectangles that would then be used to test loss reserving methods and models.

Mark Shapland and I co-chair the LSMWP, which has been subdivided into three subcommittees:

1) Group A is led by Curtis Parker and has been charged with developing a bibliography of the literature on loss simulation modeling and testing reserving methods, and with developing a statistical test to determine if simulated loss development triangles could be distinguished from actual triangles. This is a key test of the quality of the simulation model.
2) Group B is led by Joseph Marker and has been charged with estimating parameterized models of the loss development process of real company data and using these parameters to test the loss simulation model developed by Group C. The statistical test developed by Group A would be applied to determine if the simulated triangles could be distinguished from actual company triangles aggregated from the claims used to model the loss development process.
3) Group C is led by Richard Vaughan and has been charged with developing the loss simulation model in multiple software environments, refining and enhancing the model as a result of feedback, and developing technical and user documentation.

The subcommittees have achieved the following progress to date:

1) Group A has completed its work and documented it in a report that is available by clicking on the LSMWP Seminar, Interim Reports and Software link on the LSMWP page on the CAS Web Site (www.casact.org/research/lsmwp). The other items mentioned below are available on the same Web page.
2) A company has supplied Group B with data that was used to parameterize the loss development process. The Group B "Parameterizing the Loss Simulation Model" (Ball State University Research Course) is completed and is also available on the CAS Web Site. However, Group B still needs to test Group C's loss simulation model using the statistical test developed by Group A and to document these tests.
3) Group C has developed a prototype model in the APL programming language, and it has developed an initial Visual Basic version of the model. The APL prototype has been reasonably tested and enhanced as a result of feedback, and user instructions have been developed. Hence, both the run time version and the source programs of the APL prototype together with user instructions are available on the CAS Web Site. Work on the Visual Basic version has been delayed, and we are expecting to regain momentum so that this version will be tested and fully documented in 2008. The interface and capabilities of these versions are expected to differ due to the relative strengths of these software environments.

The LSMWP plans to further test the model by issuing a challenge to CAS members to see if simulated triangles can be distinguished from actual triangles. It is anticipated that the model and testing will be documented in a Working Party paper and presented at CAS seminars. A procedure will also be developed to review and test modifications proposed by users. It is also hoped that a version in the free R statistical software will eventually be developed.

Robert Bear, FCAS, MAAA, FCA, CPCU, is a consulting actuary and arbitrator with RAB Actuarial Solutions, LLC.

Boston Area to Host the '08 Ratemaking Seminar During St. Patrick's Day!

By Klayton Southwood, Chairperson, Ratemaking Seminar Committee

Photo's courtesy of Greater Boston Convention & Visitors Bureau.

Scheduled for March 17-18, this year's Seminar on Ratemaking falls on St. Patrick's Day, one of the most festive times of the year for the greater Boston metropolitan area. This forum for presenting and discussing ratemaking methods, concepts, and issues will be held at the Royal Sonesta Hotel Boston, located on the other side of the Charles River in Cambridge, MA. A variety of sessions will be offered to insurance professionals of all levels, including the annual introductory track for non-actuaries who would like to gain a stronger understanding of the various actuarial methods and issues employed in the science of ratemaking.

The two-day event will kick off with a keynote address by the Commissioner of the Massachusetts Division of Insurance, Nonnie Burnes. Ms. Burnes will share her view of the current regulatory issues in Massachusetts, including the sweeping reforms of the personal automobile insurance market, coastal property insurance availability/affordability, and the status of the new mandatory health insurance program for Massachusetts residents.

Tuesday morning will begin with a general session featuring Insurance Information Institute President Dr. Robert P. Hartwig. Dr. Hartwig will present a comprehensive overview and outlook of the cyclical forces driving the property/casualty insurance industry today. Among the key factors reviewed will be trends in profitability, underwriting performance, ratings and financial strength, investment volatility, the tort system, and developments in the regulatory and legislative arena.

The seminar is an opportunity for actuaries, underwriters, and other insurance professionals to further their continuing education. The General Ratemaking Concepts track is geared to those interested in gaining a basic understanding of ratemaking concepts. The Underwriting track will supply useful material for actuaries and underwriters alike. Overall, the seminar will offer more than 40 different concurrent sessions, covering data management and technology; underwriting workers compensation; commercial lines; personal lines; predictive modeling; risk and capital management; regulatory, reinsurance, and specialty topics; and discussion papers.

The Royal Sonesta Hotel is minutes from Boston, with shopping, museums, and historic sites all nearby. Plan now to attend and experience St. Patrick's Day in the Boston area. AR

Attend the 2008 ERM Symposium for the Latest on ERM Thinking and Practices

By Tom Hettinger, Chairperson, ERM Symposium Planning Committee

Throughout the past decade we have seen relatively stable times, but we also have seen extreme events shake our industries to their cores. This year's Enterprise Risk Management (ERM) Symposium, appropriately themed "Risk and Return in the Age of Turbulence," will illustrate why a strong ERM program is essential before, during, and after each relative cycle of results—both good and bad.

Bringing together ERM knowledge from a variety of industries, the 2008 ERM Symposium aims to build a strong cross-disciplinary framework to create systematic value and competitive advantage through effective management of risk and capital.

Now in its sixth year, the 2008 ERM Symposium is scheduled for April 14-16 in Chicago. This premier global conference is headlined by four General Sessions:

1. "Is ERM Still Relevant—A CRO Perspective" will feature a roundtable discussion of CROs addressing questions such as whether firms practicing ERM have been more profitable or had fewer losses than their competitors, and if so, what evidence can be provided.
2. "In the Pursuit of Return, Have We Lost Sight of Risk?" will focus on the general question of whether we are learning from past mistakes or simply repeating them.
3. "View from the Top" offers a face-to-face discussion with the renowned directors of some of the most prominent corporations.
4. "Strategic Risk—Making Models Relevant in Executive Decisions" will address the use of risk model results to facilitate discussions with senior management and board directors.

In addition, the ERM Symposium will offer:

- At least 30 concurrent sessions featuring top risk management experts giving their perspectives on key risk issues facing organizations
- A call for papers program showcasing new applied research in ERM
- A track of sessions featuring academics presenting ERM research from leading universities
- Several pre-program workshops on hot ERM issues
- Networking opportunities to renew and expand your list of ERM contacts
- Exhibitors demonstrating their ERM services and knowledge

Risk professionals at all levels will find relevant content at the Symposium. Concurrent sessions will range from introductory to the advanced and pre-Symposium workshops have been designed for a variety of audiences. An additional workshop will be offered in 2008, providing four options:

1. Banks and Insurers: Separate Paths but a Common Destination—Practical Tools Shared Between Financial Service Industries
2. Crisis Management
3. Operational Risk Management
4. What Board Members Need to Know about ERM

The 2008 ERM Symposium is presented by the CAS, Professional Risk Managers' International Association (PRMIA), and Society of Actuaries, in collaboration with the Asociación Mexicana de Actuarios, Canadian Institute of Actuaries, Colegio Nacional de Actuarios, Enterprise Risk Management Institute International, and the PRMIA Institute.

Visit www.ermsymposium.org to learn more about this can't-miss opportunity to broaden your knowledge of the latest ERM developments. AR

Enterprise Risk Management and Modeling (ERM^2) Limited Attendance Seminar Offered

The CAS and the ERM^2 Committee are proud to offer the Limited Attendance Enterprise Risk Management and Modeling (ERM^2) continuing education program, which will be held March 4-5, 2008, at the offices of General Re Capital Consultants (GRCC) in Stamford, Connecticut.

The program is relevant for all members and candidates who are interested in strategic decision making that affects the organization's management of capital. The program will introduce the basics of ERM and will educate attendees on how DFA modeling supports the ERM process in real-life business challenges.

Workshop instructors will help you rely on your technical, actuarial expertise to support real-world strategic decisions affecting risk and capital management. You will also be encouraged to think from the perspective of an enterprise-wide officer—as opposed to only being concerned with the traditional "smokestack" day-to-day operating responsibilities. Additionally, the course will help you integrate actuarial science with financial economics, allowing you to consider risk/capital issues from a new perspective.

The two-day workshop, taught by Janice Englesbe, CFA, and Abbe Bensimon, FCAS, will involve both lecture and hands-on application of DFA model output as applied to an actual three-part ERM case study (mini-cases). Attendees will employ CAS's proprietary DFA teaching model software, which is tailor-made to CAS specifications for the sole purpose of using a hands-on approach to understanding how a DFA tool can be used in an ERM context. Attendees will work in teams where they will discuss the case study, run the model, analyze model output, and present their team's solutions to various strategic management issues via the three mini-cases.

Enrollment for this program is limited to 30 participants and is offered on a first-come, first-served basis. To benefit most from the program, register early so you have ample time to complete the pre-readings prior to the workshop. The readings are estimated to take about 25 hours to complete.

For more information, please visit the CAS Web Site or contact Leanne Wieczorek at lwieczorek@casact.org or (703)276-3100.

ERM Exhibitor and Sponsorship Opportunities Still Available!

It's not too late to showcase your products and services at the Enterprise Risk Management Symposium this April.

The sixth annual ERM Symposium is expected to attract over 500 participants, including senior executives, directors, and risk management experts. Exhibiting at the Symposium is an excellent value and will give your company exposure to key decision makers from insurance and other industries. For $2,995, all exhibitors receive:

- **Two (2) full attendee registrations to the ERM Symposium**
- **Complimentary food and beverage in exhibit hall for one (1) booth representative**
- **Booth space (10'x 10') in the exhibit hall**
- **Listing and company description in the program directory**
- **Listing, Web link, and description on the ERM Symposium Web Site**
- **Listing and description in co-sponsoring organization's publications**
- **Pre- and post-conference attendee list (with available e-mail addresses)**

Corporate sponsorship of ERM Symposium events is also available.

Please visit the ERM Symposium Web Site (www.ERMSymposium.org) or contact Leanne Wieczorek at lwieczorek@casact.org or (703) 276-3100, ext. 731, to learn more about being an exhibitor or corporate sponsor at the premier global event on ERM.

Celebrate Québec's 400th Anniversary at the 2008 CAS Spring Meeting

Taking advantage of our Canadian destination, the CAS Spring Meeting will feature a joint meeting day with the Canadian Institute of Actuaries and Society of Actuaries on June 18, 2008 in Québec City.

The 2008 CAS Spring Meeting begins on Sunday, June 15 and runs through Wednesday, June 18. The meeting will provide substantial opportunities for continuing education, with sessions covering a variety of current, relevant, and important actuarial and risk management topics. General Sessions will focus on Economic Capital Modeling, Catastrophe Modeling, Run-Off, and Sustainability Risk Management. A CEO Luncheon Panel will include presidents from all three societies: Christopher S. Carlson (CAS), James H. Murta (CIA), and Bruce Schobel (SOA).

The Spring Meeting attendees can benefit from the collaborative efforts of session presenters who make up the panels of this stellar educational program. While every day of the meeting, including Wednesday, offers a full day of sessions, a generous amount of time will be available for networking, social events, and Québec City's 400th anniversary celebrations.

The unique CAS, CIA, and SOA joint meeting day will feature 20 concurrent sessions and two general sessions. The joint concurrent sessions will focus on medical trends, ethics, international interests, and predictive modeling. Michael Sherris will present his 2007 ARIA Prize Paper, "Solvency, Capital Allocation and Fair Rate of Return in Insurance."

The joint meeting will take place at the Québec City Convention Centre, located in the heart of the city across from the Parliament Building and just steps from the fortifications. It is linked by underground walkways to a complex that includes two major hotels, indoor parking, and a shopping center.

With the exception of sessions during the joint meeting day, all CAS Spring Meeting sessions and events will be hosted at The Fairmont Le Château Frontenac (http://www.fairmont.com/frontenac/Index.htm), a renowned historic hotel overlooking the St. Lawrence River and located in the heart of old Québec.

The CAS encourages its members to take advantage of this unique opportunity to attend the CAS Spring Meeting and the integrated joint meeting day with CIA and SOA. Additional information about these events can be found on the CAS Web Site. AR

Spring Meeting Goes Paperless

CAS is excited to announce that this year's meeting will be paperless; therefore, you will have the opportunity to view and download session handouts prior to the 2008 Spring Meeting.

Cambridge to Host Reinsurance Seminar

The 20th annual CARe Reinsurance Seminar will take place on May 19-20, 2008, at the Royal Sonesta Hotel Boston, located in Cambridge, MA.

Reinsurance Seminar sessions cover such topics as catastrophe modeling, environmental liability, unique applications of exposure rating, and parameter risk. The CAS Committee on Reinsurance Research will host the Research Corner, a forum where participants can present projects they are working on or have recently completed, which pose new problems and demonstrate innovative practical approaches.

A registration brochure for the seminar will be mailed to members in April. More information will also be posted on the CAS Web Site. AR

Quality Control for "The Information Factory"

Enterprise Knowledge Management: The Data Quality Approach by David Loshin (The Morgan Kaufmann Series in Data Management Systems, 2001, $49.95)

Reviewed by Gregory Scruton,
Member, CAS Data Management and Information Educational Materials Working Party

David Loshin's *Enterprise Knowledge Management* provides an enterprise-wide framework for data quality. Loshin likens the flow of data within an organization to the assembly process in a manufacturing plant, often referring to an organization's data production as "the information factory." The author uses many quality control ideas from the world of manufacturing and applies them to the process of manufacturing information in an enterprise.

Each of the book's chapters outlines one building block of an enterprise data quality program. The book is at once both technically detailed and conceptually rich.

Technical data quality concepts are illustrated by a number of real-world data examples. The data examples are not insurance specific, but rather generic, typically using universal business elements such as name, address, location, and phone number. Nevertheless, the concepts are universal and especially applicable in an industry such as insurance, where data drives the business. The actuary will recognize many of these concepts, described generically in the text, as applicable to the actuarial topics of ratemaking, reserving, or modeling.

While containing some technical details, the text is curiously abstract, relying mostly on high-level conceptual material. It resembles an Actuarial Standard of Practice in that for each topic a list of conceptual considerations and best practices are given, but with few concrete recommendations as to which are most important. That determination is left up to the practioner's judgment. The text is suitable for anyone who oversees information flow within an organization: the CIO, the systems manager, or the actuary who oversees information infrastructure.

Loshin begins with a section on how to build support for data quality management within an organization. The first step is to get senior management buy-in for the program. Start with a small but visible data quality issue. In choosing an initial task, the author invokes the Pareto or "80-20" rule, which states that 80% of the impact is usually generated by 20% of the cases. Quantify both the soft and hard costs of allowing the issue to linger. The author recommends using a process known as COLDQ (cost of low data quality) that maps the information chain, and then builds a Data Quality Scorecard to identify potential problem nodes in the information manufacturing chain.

For instance, if the issue is faulty customer addresses, the associated costs might include hard impacts like the cost to repair data and increased customer service expense, but also soft impacts like increased customer attrition or delay in dependent analysis and initiative implementation. In an insurance setting, these "soft" costs might be manifest in the inability to analyze catastrophe data or to reorganize rating territories, for example. Next, to gain buy-in, demonstrate to management the operational benefit and rate of return associated with fixing the issue. Once the issue is addressed, celebrate the solution and thereby build support and enthusiasm to address further data quality issues. A key component of the "solution" is to establish a data ownership policy. The author gives many different paradigms for "who should own the information" in various settings, but it should always be formalized and agreed upon.

The author discusses various dimensions of data quality, e.g., completeness, flexibility, robustness, essentialness, granularity, and precision, among others, as they relate to data models, data values, information domains, information presentation, and even the corporate information policy itself. One or two indices are given as guidelines for how to compute each measure of data quality—for example, chart the number of requests to add new data fields over time to measure comprehensiveness.

Once data quality measures and thresholds have been established, they can be measured either statically or dynamically. Static measurement involves collecting and analyzing past data, usually after the end of a time cycle, and is useful for identifying *chronic* data quality issues. Dynamic measurement involves inserting data probes into

The Book Shelf page 14

The Book Shelf From page 13

the information chain and measuring output in real time. This is useful for identifying *acute* data quality issues. Data quality measurement is often implemented via a rules-engine containing data and business rules and acceptable tolerance thresholds for each. The author spends a fair amount of time in listing considerations when evaluating different rules-based systems and products. Often the choice of a particular rules engine will depend upon whether measurements are primarily static or dynamic.

The author then devotes several chapters to data cleansing. Data cleansing is the act of "fixing," i.e., appending, supplementing, or overwriting data whose quality has tested low. Often this involves merging data from two different data sources. The author describes techniques used to determine if two different data fields' members come from the same domain. The concepts of overlap, agreement, and disagreement are discussed and a formula given for computing the degree of each between two data sets.

If a data domain is unknown (this usually occurs in string fields housed in legacy mainframe data systems), a number of domain discovery techniques are given; among them agglomerative, divisive, hierarchical, and *k*-means clustering. Each of these clustering-based methods relies on a notion of distance between data points. Distance rules are typically

Euclidean $\left(d = \sqrt{(x_1 - x_2) + (y_1 - y_2)^2} \right)$,

city block $\left(d = (x_1 - x_2) + (y_1 - y_2)\right)$,

or exact match. "Exact match" distance rules are used to compare the distance between strings and are extremely helpful in data clustering, data cleansing, and spelling and address checking routines.

One distance rule used to compare strings is "edit distance" or the minimum number of basic operations (insert, delete, transpose) needed to transform a candidate string to a target string. For example, the edit distance between "intermural" and "intramural" is 3.

The author also gives a number of approximate matching techniques to match like strings using the notion of distance in combination with various word and phonetic coding schemes such as Soundex, NYSIIS, Metaphone, and n-gramming. Each of these methods attempts to simplify the phonetic representation of a word (by omitting vowels, coding like sounds, and the like) and then uses the notions of distance above on the coded entries to identify approximate string matches.

As an aid to these matching and clustering techniques, the author enumerates a number of common error paradigms and their causal conditions. For example, a data format that is "too strict," e.g., insisting on a middle initial for every name entry, will tend to generate erroneous "placeholder" data entries.

In a specific data cleansing case study, the author describes a technique for standardizing residential and business addresses based on data rules established by the U.S. Post Office. The author then proceeds to describe a number of general data cleansing and enhancement tools, including date/time, contextual, geographic, demographic, psychographic, and inferential data enhancement. An example of an inferential enhancement might be to assign a "primary decision maker" field to a household database based on the most frequent credit card user within the household.

Finally, the text summarizes each of the chapters as building blocks needed to build data quality practices for an enterprise. This book is a good primer on data quality concepts. It lists, in a systematic and formal way, many of the things that an actuary knows to look for intuitively, but may not know how to articulate formally. While it is a long book, it is not an especially difficult read. It could be put to good use in constructing a checklist of data quality best practices that one would run through when building or implementing a new database or system architecture. AR

CAS Discipline Committee Annual Report to the Board

Background. The CAS Rules of Procedure for Disciplinary Actions (as amended November 14, 1998, by the Board of Directors) requires an annual report by the Discipline Committee to the Board of Directors and to the membership. This report shall include a description of its activities, including commentary on the types of cases pending, resolved, and dismissed. The annual report is subject to the confidentiality requirements.

2007 Activity. A case involving a candidate for admission to the CAS was referred to the discipline committee by the CAS Board of Directors on July 2, 2007. The investigative panel of the discipline committee completed its review and issued its recommendations on September 26, 2007. The review panel of the discipline committee will be meeting on December 10, 2007, to review the recommendations of the case and decide on a course of action.

There are no other cases or actions to report. AR

Members Support Increased ERM Education

MAP Survey Results Provide Insights

By Kevin Dickson, CAS Vice President-ERM

Over the last several years, the CAS has sought to prepare its members for opportunities within the growing field of Enterprise Risk Management (ERM) and has undertaken many activities to this end. For example:

- ERM sessions are now a standard part of meetings and seminars.
- New material has been introduced on the exam syllabus.
- Partnerships have been established with like-minded organizations pursuing ERM opportunities, such as the SOA for the Joint Risk Management Section and the renowned ERM Symposium.
- A Vice President-ERM position was established on the Executive Council to encourage these activities and many others.

In order to gather preliminary feedback on the impact of ERM initiatives, a survey was recently conducted with the Member Advisory Panel (MAP). MAP was formed in 2004 to provide CAS leaders and committees with access to a representative collection of members who are willing to participate in surveys and research conducted by the CAS. There were 104 members of the panel at the time this survey was conducted, and 84 completed surveys were submitted.

Key Results

- More than three-fourths agreed that actuaries are ideal candidates to be involved in ERM.
- Nearly three-fourths agreed that ERM adds value to their organization.
- A majority of respondents indicated that their knowledge of ERM is "limited" and that they have some awareness of what the CAS is doing to promote ERM to its members.
- A majority of respondents indicated that new skills are needed by actuaries to work in ERM.
- ERM training without a travel requirement was the most popular option for delivering education to members.

In summary, there is strong enthusiasm despite the responses indicating that a large number of members have limited knowledge of ERM. Members view ERM as important to actuaries and an overwhelming proportion believe it is important to their organization. Many members believe ERM is creating significant career opportunities for actuaries, even beyond the insurance industry. In addition, there is a strong belief that actuaries should be at the forefront of ERM activity.

While a majority indicated that actuaries need to learn new skills to practice ERM, there was strong interest in a variety of educational vehicles that would help members prepare for ERM opportunities.

Results of the survey will be used to help set the direction for future CAS ERM-related activities. The complete survey report can be found on the ERM Web page of the CAS Web Site at http://www.casact.org/research/erm/.

The MAP is managed by the Member Advisory Panel Committee and additional panelists are always welcome. The MAP Committee also encourages CAS leaders and committees to consider using MAP to gather member feedback. More information regarding the MAP, including surveys completed by the MAP, may be found at http://www.casact.org/members/committees/mapc/ or contact the Chair of the MAP Committee, Mike Blivess, at mike.blivess@milliman.com.

DOUG OLIVER

What If We Cease to Be?

The World Without Us by Alan Weisman, (Thomas Dunne Books, St. Martin's Press, 2007, $24.95)

Most actuaries, be they property, casualty, life, health, or pension-based, spend at least some portion of their careers playing the "what if" game. What if interest rates increase by more than inflation over the next five years? What if medical inflation outstrips cost of living? What if I selected a more (or less) conservative loss development factor?

Alan Weisman's 2007 suppositional nonfiction book, *The World Without Us*, applies these same "what if" scenarios to the creative assumption that one day all humans on Earth cease to exist. Not from nuclear, asteroidal, or other ruinous event; we all simply vanish. What would happen? How would Mother Earth respond in the face of what we have left behind?

Weisman spends quite a bit of time in the book's four parts describing specific floral and faunal environments, how they have developed even in spite of human presence, and then he describes how these sites would respond once we were gone. Take the New York Botanical Gardens, for example. While currently preserved and protected from urban influences to the extent possible, once the gardeners have all disappeared, the heartier varieties of plant life will likely overtake the more visually appealing, yet fragile, species. While lilies and orchids may be pretty, they will not survive in this brave new world.

The book covers a wide variety of scenarios involving the current effect humans have on animal life. For example, humans kill approximately 100 million sharks a year (from babies to full grown adults), yet sharks attack only about 15 people per year. While this is obviously not a fair fight, imagine the impact on the seas when humans aren't around to desire shark fin soup.

Similarly, the book provides some very detailed insight into the fate of man-made structures and how they will deteriorate over time. It is interesting to realize that our toilets might survive the longest, as fired porcelain is actually a very close cousin to fossils.

The text does ramble a bit. The descriptions of certain forests or nature preserves, while exacting in their detail and representations, seem to drag on for just a page or two too long. I also found myself skipping through some of his introductory sections and delving directly into his paleontological or anthropological topical meat.

The text provides some fascinating trivia. For example, without the support staff and electricity to keep the 753 pumps running under Manhattan, the New York City Subway will flood as a result of the influence and movement of 650 gallons per minute of natural groundwater. What lasts are structures where humans have attempted to utilize natural architecture, such as the underground caves built 5,000-10,000 years ago in the Cappadocia region of Turkey, which remain as strong as ever today, and, to quote *The Graduate,* "Plastics" (there is one chapter titled "Polymers are Forever"). One expert commented, "Except for a small amount that's been incinerated, every bit of plastic manufactured in the world for the last 50 years or so still remains. A half century's total production now surpasses 1 billion tons." Since no bit of manufactured plastic has yet to die a natural death, its lifespan is unknown. Exactly when plastics would break down and be absorbed by nature is still unresolved.

"What would we want our legacy to be?"

As a thought-piece on the tentative mechanical, structural, and physical relationships that we have built over the past two thousand or so years, the book does give a reason to pause and think, "What would we want our legacy to be?" Have we reached a tipping point where no amount of time can rejuvenate certain

items and areas, or would Gaia bring it back nonetheless? The text is written in generally straightforward and informative prose, with enough footnotes and bibliographical references for anyone wanting to do more reading or research.

What I found most fascinating, however, was reading through the text with an eye towards the more extreme results—what will last the longest (plastics), what will disappear faster than I would have expected (aluminum), what will happen to glass (it too will ultimately break down). I found myself thinking that I now have a reference for some of the more obscure *New York Times* Crossword Puzzle clues as well as some starter conversations for cocktail parties ("Did you know that the area of Houston is large enough to hold Cleveland, Baltimore, Boston, Pittsburgh, Denver, and Washington, D.C., with room to spare?"). Well, maybe an actuarial cocktail party. AR

Tech Books Web Site and A Call for Book Reviewers

On a more technical note, point your Web browser to the J. Wiley Web Site at http://www.wiley.com/WileyCDA/Section/id-300625.html for current texts and treatises on actuarial methods and theories.

A section in this popular and dense site is dedicated to statistics for finance and business, with quite a few books on actuarial mathematics. Some of the more recent additions include *Actuarial Theory for Dependent Risks, Bayesian Econometrics,* and *Financial Surveillance*. In particular, the most recent text by Michel Denuit et al., *Actuarial Modelling of Claim Counts: Risk Classification, Credibility and Bonus-Malus Systems*, takes a very deep mathematical approach to the effects of claim count analyses (frequency, severity, effects of deductibles), with particular focus on and data from Auto (Motor) lines of business.

The Quarterly Review is dedicated to all books of interest to actuaries. If one of these more technical texts catches your eye, please contact the *AR* Editor in Chief at ar@casact.org about writing a book review for a future *AR*.

25 Years Ago in *The Actuarial Review*

Obligations of the Actuarial Profession

By Walter C. Wright

Frederick W. Kilbourne's reflections and questions about the obligations of the actuarial profession are as relevant today as they were 25 years ago. Following are the first three paragraphs from Fred's "Meet the President" column that appeared in the February 1983 issue of the Actuarial Review.

I believe the actuary has an obligation to offer services when there is a need that falls within his field of expertise. In general, I believe the actuarial field has a perimeter defined by financial consequences (i.e., money) and uncertain event (i.e., the future). If both money and the future are involved in a problem, we are probably best trained to design the solution. If either is missing, we probably are not. The actuarial field deals with the financial consequences of uncertain events. Do you share this belief?

I further believe this obligation extends to quite a list of people. The list includes the public, your client or employer, your fellow professionals, yourself. I don't believe we have obligations to institutions as such, just to people. But if the client is an insurance company, for example, our obligation is to the stockholders and policyholders, to management and the employees. And I think that competing interests should be resolved in the order given in the list above, starting with the public. What do you think about this belief?

I further believe that our profession deserves mixed reviews in terms of having met our obligations in the past. We've done a very good job in the life insurance part of our field, and a pretty good job in the casualty insurance part. We've done a relatively good job in the private employer benefit area, and a relatively poor job concerning public employee benefits and social insurance. And we haven't done much at all in the other areas of need within our general field of expertise. How do you feel about this view of our performance to date? AR

New CAS Fellows and Associates Honored at 2007 Annual Meeting

New Fellows, 1st Row (L-R): Carole K.L. Ho, Neil A. Greiner, Jason Arthur Clay, Cari Bergen Winebrenner, **CAS President Thomas G. Myers,** Christopher G. Fanslau, Kelly J. Hernandez, Jin Liu, Kayne M. Kirby, Eric W.L. Ratti. **2nd Row (L-R):** William Allen Hossom, François Blais, Clista E. Sheker, Robin A. Fleming, Elizabeth Bomboy Shumaker, Travis J. Miller, Shauna S. Williams, George N. Argesanu, Melissa D. Elliott, Sean M. McAllister, Arvelle D. Zacharias, Genevieve Aubin, François Langevin, Jacqueline Lee Neal, Nicholas W. Saeger. **3rd Row (L-R):** Kenneth L. Leonard, James J. Leonard, Levente Thomas Tolnai, Stephen P. Decoteau, Joseph Patrick Hasday, Kenneth Robert Kahn, "Thomas" Sai Fan Chan, Jean-Pierre Paquet, Chris John Van Kooten, Samir Khare, Rachel Radoff, Kenneth M. Decker, Andrew Yershov, Felix Podgaits.

New Fellows, 1st Row (L-R): Yanfei Z. Atwell, Jianlu Xu, Minwei Wei, Michael A. Lardis, **CAS President Thomas G. Myers,** Yu Zhou, Min Yao, Yingnian Wang, Laura M. Morrison, Mariane Takahashi. **2nd Row (L-R):** Alison Therese Khan, Jane W. Hughes, Kristin Marie Palm, Doris Lee, Zilan Shen, Jie Xiao, Jiwei Yu, Zhikun Wu, Shuk Han Lisa Yeung, Christopher L. Wampole. **3rd Row (L-R):** Ronald Taylor Nelson, Zoe F. S. Rico, Luc Tanguay, Yulai Yang, Yisheng Bu, Yue "Jeff" Zhao, Liang Guo, Chong Gao, Alice H. Tsai, Juemin Zhang, Suejeudi Buehler.

New Fellows, 1st Row (L-R): Francis L. Decker, Brian D. Archdeacon, Hyeji Kang, Tracy L. Child, **CAS President Thomas G. Myers,** Nicolas Beaudoin, Brenda L. Koenig, Megann Elizabeth Hess, Annie Chang, Allison L. Morabito. **2nd Row (L-R):** Robby E. Thoms, Anthony O'Boyle Beirne, Shawn T. Chrisman, Alexander Jonathan Laurie, Robert B. McCleish IV , Kimberly A. Borgelt, Amanda Cole Lubking, Mitchel B. Merberg, Minchong Mao, Jonathan M. Knotwell, Yuchun Mu, Justin M. VanOpdorp, Kevin John Van Prooyen. **3rd Row (L-R):** Leong Yeong Chew, Michael Li Cao, Brian J. Mullen, Tyree Harris, Brent M. Sallay, Timothy G. Wheeler, Jason M. Rosin, Eric Linwood Savage, Yi-Chuang "Sylvia" Yang, Richard R. Ross, Raymond Bond Shum, Millie Man Sum Lo, Annemarie Sinclair, John David Lower, Zhongmei Su.

New Fellows not pictured: Ying M. Andrew, Michael J. Andring, Christopher David Bohn, James M. Boland, Simon John Buxton, Chun Kit Cheung, Heejae Cho, David J. Curtis, Melisa L. Darnieder, Amy L. DeHart, Matthew S. Dobrin, Yiping Dou, Isaac R. Espinoza, François Godbout, Joshua Rolf Harold Griffin, YinYin Huang, Scott R. Jean, Cunbo Liu, Alistair Duncan Macpherson, Amanda Cater Marsh, Kirk Francis Menanson, Christian Morency, Maria M. Morrill, Michael J. Quigley, Arthur R. Randolph, Juan Carlos Rodriguez Mayoral, Bradley M. Rolling, Rachel Katrina Rutledge, Derek Michael Schaff, Jiyang Song, Zhenyong Zhang.

New Associates, 1st Row (L-R): Karen Marie Commons, Jaya Trivedi, Lisa K. Juday, Megan Laurissa Astudillo, **CAS President Thomas G. Myers,** Deborah Joyce Upton, Davina Bhandari, Danielle J. Aufiero, Xiang Ji. **2nd Row (L-R):** John Francis Pagano, Jacob C. Fetzer, Dana Embree, Paul Jeffrey Hurd, Lyndsey Jo Schwegler, Nadiya Rudomino, Kalynn D. Haubert, Kasi Joelle Golden, Moiz Rawala, Vincent Ha. **3rd Row (L-R):** Tony Alan Van Berkel, Yong Jiang, John Michael Jansen, Ian Philip Sterling, Wei-Chyin Tan, James Lohman Pearson, Daniel Gregory Collins, Scott Allen Donoho, Christopher Nicholas Otterman.

New Associates, 1st Row (L-R): Ann M. Sydnor, Jennifer Marjorie Poeppelman, Andrea Wong Cablayan, Kanika Vats, Junhua (Blanca) Qin, **CAS President Thomas G. Myers,** Xueming Grace Wu, Wanning Wu, Christine Béland, Virginia Marie Zeigler, Vikas Pravin Shah. **2nd Row (L-R):** Martin John Van Driel, Amanda Rachelle Kemling, Aran Jee-Yun Paik, John Carroll Hanna Jr., Martin P. Chouinard, Karine Trudel, Marie-Pierre Valiquette, Josy-Anne Tanguay, Catherine Lemay, Vincent Lepage, Zhigang (Kevin) Huang, Tehya Rose Duckworth, Eecher Yee, Carl Chang. **3rd Row (L-R):** Alissa Wendy Vreman, Jim Klann, Stephen A. Bowen, John K. Knapstein, Jamie Michael Weber, Vincent Quirion, Lucas James Koury, Mathieu Farrier, Pierre-Alexandre Jalbert, Alexander Kozmin, John Spencer Wideman, Max Harpo Mindel, Zhe (Robin) Li, Derek Michael Martisus, Jean-François Bolduc.

New Associates, 1st Row (L-R): Fengru Liu, Joshua Adam Taub, Mark Robert Hoffmann, Mathieu Gravel, Randi Margarete Dahl, **CAS President Thomas G. Myers,** Perry Anne Klingman, Jeffrey J. Clair, Xiaoli (Shirley) Ma, Sara Lynn Buchheim, Joel M. Smerchek. **2nd Row (L-R):** Mariano Roque Blanco, Amit K. Gupta, Kirt Michael Dooley, Manuel Santiago Guerra, Dusan Kozic, Rebecca Heather Holnagel, Bradley James Andrekus, Yongxing David Li, Marcus Ryan Aikin, Daniel Owen Schwanke, Robert Lindsay Brown, Charles Hunter Birckhead. **3rd Row (L-R):** Scott David Hornyak, Cody William Cook, Jonathan M. Schreck, Chad Matthew Miller, Jeffrey N. Farr, Paul Houghton Mayfield, Justin L. Albert, Steven Michael Wilson, Aaron J. Beharelle, James Michael Smith, John Arthur Krause, Kevin Scot Burke, John Richard Emig.

New Associates, 1st Row (L-R): Nora Newman Benanti, April Marie Truebe, Elena Claudia Iordan, Heidi Marie Garand, Dawn Marie Thayer, **CAS President Thomas G. Myers,** Mandy Mun Yee Seto, Jason Anthony Cabral, Erika Lee Anderson, Christina Dione Abbott, Stacey Inez Roach. **2nd Row (L-R):** Alejandro Morales, Marina Vaninsky, Zhijian (Paul) Xiong, Christian Werden, Horng-Jiun Kimmy Fann, Meredith Anne Huskey, Dustin J. Loeffler, Ying Huang, Junya Zhang, Bradley J. Parker, Chad Ryan Schlippert, Paul Daniel Herzog, Bruce A. Ritter, Mitchell Lee Underwood. **3rd Row (L-R):** Peter H. D'Orsi, Eric Lawrence Vaagen, Ian Christopher Asplund, Jacob John Kelly, Jason Jennings Culp, Michael William Payne, Scott J. Rasmussen, Stéphane Renaud, Jared Gabriel Smollik, Jason N. Harger, Ryan Vincent Capponi, Matthew Daniel Sharp, Brady Lee Hermans.

New Associates not pictured: Ross Henry Anderson, David Michael Andrist, Steven G. Brenk, Frank H. Chang, Hungchi Andy Chang, Vivien Kwong Hiu Chiang, Gareth John Christopher, Jason A. Clark, John Anthony Duffy, Yan Lap (Jess) Fung, Priyangsha S. Godha, John James Hageman, James Richard Healey, Joseph H. Hohman, Caleb Enders Huntington, Annie-Claude Jutras, Yongwoon Kang, Reng Lin, Jie (Michael) Lu, Evan Pearse Mackey, Jerrel Harlan Mast, Daniel John Messner, Eliade Mihai Micu, Erick E. Mortenson, Andre Khoi Nguyen, Erin Michelle Olson, Melanie Ostiguy, Elisabeth Picard-Courtois, Donald Scott Priest, Conni A. Rader, Jordan Rubin, Yipei Shen, Daniel Tinoco, Daniel Martin Van der Zee, Thomas Wesley Vasey, Daniel Viau, Min Wang, Meng Yan, Jin Zhang.

All in the Family—Brothers Earn their Fellowships

By Leslie Marlo

As Ken and Jim Leonard received their Fellowships in the Casualty Actuary Society at the Annual Meeting on November 12, 2007, family members cheered on the two brothers from the audience and remotely via Webcast. For Ken and Jim, their simultaneous achievement is just one of many pursuits that they have shared over the years.

Ken, older by one and a half years, first learned of the actuarial profession from a high school algebra teacher. He had intended to become an architect, but his teacher's suggestion, together with the actuarial profession being rated the number-one career and an award of an athletic scholarship to attend Illinois State University, changed his career path. Coincidentally, only after passing the first exam did Ken learn that his cousin Philip Imm was also studying to become a property/casualty actuary. As Ken and Philip reviewed Actex study manuals, they shared the actuarial exercises with Jim. Jim had been leaning toward a career as a math teacher and coach, but this exposure soon convinced him to become an actuary as well. Jim and Ken agree that the source of their strong mathematical genes is a mystery, but with another brother who is a civil engineer and Philip receiving his Fellowship in 2003, it is clear that such talents run deep within the family.

Exam 8 was the first exam that the brothers sat for together, but they have spent many years studying together. Roommates not only in high school but also for three years at Illinois State, Ken and Jim recall long nights—fueled by large quantities of Mountain Dew—of studying for various exams. They have taken exam seminars together and bounced concepts off each other, supporting each other's efforts to pass. And now that they have finished taking exams, they volunteer on the same Exam Committee.

However, their day-to-day work paths have diverged. Ken started out as a consulting actuary and, citing the diversity of work experiences, happily remains one at Towers Perrin. While Jim also enjoyed the excitement of the consulting world, he determined several years ago that his career would benefit from seeing a company's operations from the inside, and he is now assistant vice president and actuary at CNA Insurance Companies. Both Ken and Jim express considerable satisfaction with their work lives, disregarding the heightened attention that new Fellows and Associates receive from actuarial recruiters.

Outside of the office, the brothers' paths again become similar, with family being paramount. Both Jim and Ken are married—Jim to an Associate of the Society of Actuaries—and they are in the midst of raising their young children. Ken notes that his actuarial skills are almost a disadvantage as he tries to help his 10-year-old daughter with elementary school mathematics. The concepts are easy for him but are being taught differently than when many of us were growing up. Yet both brothers enjoy helping their sister, now in college, with her math homework. Meanwhile, their love of sports is manifested through coaching their children's soccer and basketball teams.

When the extended family gathers, which is often, one might wonder if insurance and actuarial work would be the hot topics of conversation. In the past, this has not been the case. However, with the new qualification standards in effect soon, Ken jokes, "Since we don't work at the same companies, now we are going to meet our organized activity continuing education hours during holiday gatherings." In reality, now that the Leonards have their Fellowships, gatherings prove to be much more relaxing. Jim notes that with the Fall exam scores always arriving just in time for the holidays, moods at that time of the year could be very dependent on the scores received.

This close-knit family, in which the Leonards' parents took time off work to attend the induction ceremony for new Fellows, is happy to have Jim and Ken back. The brothers themselves say that the elation of passing previous exams was supplanted this final time with sheer relief at knowing their studying days were over. Now they have even more time to enjoy their professional and personal lives. AR

A Family Affair

Are you part of a family of actuaries? The Leonards have started us off, but we know there are more of you in the profession. If you and your sibling, spouse, parent, or child is an actuary, or if you know of such a relationship, we'd like to hear from you. Send us a note at ar@casact.org. We will be compiling a list of these actuarial relationships for a future issue of the *Actuarial Review*.

ERM Developments: 2007 at a Glance

By Jonathan Bilbul, U.K. Correspondent

At the stroke of midnight on New Year's Day, we have the custom in English-speaking countries of singing an old Scottish song called "Auld Lang Syne." The title, which refers to "old long since" or "days gone by," is appropriate as we reminisce about the past and make plans for the new year.

The year 2007 has certainly given us much to think about in the insurance industry. In Europe, government bodies, regulators, rating agencies, and insurance companies have all played a part in strengthening the foundations of our industry, as we make plans for the future and move towards implementing Solvency II. Much progress has been made in the push for a more risk-sensitive approach to measuring capital required and benefiting from capital held. These changes coincide with efforts in the United States to implement enterprise risk management (ERM) practices at many companies. Let's now consider some of the important developments of the past year in Europe.

In October, the Financial Services Authority (FSA), the U.K. regulator, published a report called "ICAS—Lessons Learned and Looking Ahead To Solvency 2." Individual Capital Adequacy Standards (ICAS), which came into effect at the end of 2004, moved away from rules-based regulation and adopted a principles-based approach. The onus now is on the company to justify the amount of capital held, as the management should be in the best position to properly understand the risk inherent in the business. The report provides a useful progress report. Its main conclusions:

- The level of capital in the industry is relatively unchanged since the implementation of this regulatory regime.
- Insurance risk, composed of underwriting risk on projected new business and reserving risk on prior year claims, accounts for 68% of capital allocated for general insurance companies. The other risk types are market, credit, liquidity, operational, and group risk.
- If there is a gap between the regulator's and the firm's view of capital, an individual capital guidance (ICG) is issued by the FSA. The ICG was on average 14% higher than the assessments of capital made by each company, and most fell in the range of 0-10%. This signifies that most companies are assessing their capital adequately.
- The regime has encouraged a risk management culture. The investment in capital modeling has been a success, with most firms using the models for reaching key decisions such as dividend payment, reinsurance purchase, or due diligence on acquisitions. However, further work is required so that firms fully embed their models into the risk management framework.
- Integrating an economic capital model can take five years, including the time for the initial build, further refinement, calibration, and having the model used across the organization.

On the Solvency II front, the new regulatory regime for reinsurance companies in Europe, there have been many developments.

In July, the E.U. Commission published a framework directive on Solvency II. This directive pushes back the implementation date by a couple of years to November 2012, but it provides a clear picture of the way forward.

Solvency II will resemble the ICAS regime in many respects. It, too, will have a risk-sensitive approach to regulation and will allow internal models to assess capital, although this is not a requirement. Here, too, satisfying the "use test" will be crucial to validate an internal model, as it will demonstrate that management actually uses the model and believes in its results.

As an alternative, insurers can adopt a standard formula for calculating regulatory capital or even a hybrid assessment, using the standard formula for some risk types and a partial internal model for the others. The directive also emphasizes the importance of having robust risk management practices to mitigate against insurer failure, and clear disclosure of these practices. Thus, the aim is to align risk measurement and risk management.

In November, the Committee of European Insurance and Operational Pensions Supervisors (CEIOPS) published the "Report on its third Quantitative Impact Study, QIS3, for Solvency II." Each study allows firms to test different aspects of Solvency II and comment on their suitability based on their company-specific information and certain proposed calculation methods and factors.

QIS3 had the highest response yet. Some highlights include:

- The regime would not require extra insurance capital overall, but there would be big variations among companies. Surplus, the excess of available capital over regulatory capital required, would increase by more than 50% for 30% of firms, while it would decrease by more than 50% for 34% of firms. Furthermore, 16% would have to raise additional funds to meet surplus requirements.

Actuaries Abroad page 22

Actuaries Abroad From page 21

- Only 13% of respondents used internal models to quantify results. This may be partly because some respondents were unwilling to disclose results. The reduction in total required capital for nonlife insurance companies seems to be about 25% as compared with the standard formula.
- In calculating diversification benefits, the standard formula set out in QIS3 did consider interaction between risk types according to a predefined correlation matrix. However, when setting capital the correlation of events in the tail of the distribution has the greatest impact.
- Many firms regretted that, for reasons of simplification, expected profit/loss in nonlife business was no longer considered in the calculation since it is important in valuation of capital required in the nonlife component. From an economic perspective, expansion into new lines of business has a favorable effect on capital as long as it is profitable.
- Firms felt it important to recognize quality of operational risk management; factor-based calculations do not give incentives to develop adequate risk management systems.
- To assess the impact of catastrophe losses under the standard approach, insurers must quantify the impact of a list of prescribed scenarios on their balance sheet and income statement. It is, however, difficult to choose standard scenarios appropriate for the risk profiles and reinsurance arrangements of every firm. Catastrophes represent a serious threat to insurance company solvency and must be treated in a coherent manner across all countries and legal entities.
- Although feedback was limited, the report did reach some initial conclusions about diversification benefits within groups, which can vary both from their sources and their amount. Many global insurance groups gain significant diversification benefits from insurance holdings outside Europe. How would diversification be allocated within and outside the European Community? These are areas of research for QIS4 to be released next spring.

All the shortcomings of the standard formula identified by QIS3 are addressed if a company builds a full internal model. Solvency II creates incentives for companies to do so, as models provide a far more realistic representation of the degree of risk in company operations. They treat risk consistently across legal entities, are based on economic values, reward better risk management, and allow for the full effects of diversification.

Meanwhile, the Standard & Poor's Second Pan-European Insurance Symposium was held in Brussels in June. Here, too, ERM is gaining in importance. In her introductory remarks, S&P President Kathleen Corbet stated:

> Over the last five years, the shift towards greater transparency, the intensifying focus on risk management and rapid emerging securities-linked insurance market have changed the global insurance landscape, and a revolution in regulation is under way. Together these changes have created potential for the industry to embark on an era of consistent success. . .Will the industry seize this opportunity?

There was talk about recent changes to the way financial strength ratings are set. In the context of evaluating ERM practices, S&P use their capital model as a tool for discussion with companies. They compare their own results with the results from the company's economic capital model. The absolute answer from either model is less important than the resulting interpretation and understanding of risk.

Paul Sharma of the FSA, who chairs the CEIOPS Pillar I Expert Group, developed the theme of revolution in his keynote speech. He foresaw a possible move away from the cyclical nature of the insurance industry towards a period of stability, security, and success, with economic capital models playing an important part in this new era. Sharma said that "The potential for capital savings, if you can quantify your risks to a high standard, I think is going to be significant—significant enough to drive pricing, significant enough to drive competition." Although Solvency II is a driving force, these changes are already taking place in jurisdictions across Europe.

Another noteworthy event was the Royal&SunAlliance (RSA) capital presentation to the investor community in September. George Culmer, Group CFO, demonstrated how their economic capital model is an integral part of running their business and delivering financial results. The model is used at all levels and to support a broad spectrum of applications. The eight key areas where it provides more informed decisions are (1) capital structure evaluation, (2) insurance risk management, (3) investment management, (4) transaction evaluation, (5) reinsurance purchasing, (6) performance management, (7) product pricing, and (8) strategic and operational planning.

The key message is that RSA is well managed and taking steps to achieve optimal return on capital. In the weeks following this presentation, RSA's stock price significantly outperformed the FTSE All Share Non-Life Insurer Index.

There has been much progress towards implementing ERM practices in the insurance industry during 2007, as evidenced by these developments in Europe. In the United States as well, rating agencies, the Minnesota and New York state regulators, and individual companies have all pushed forward the case for ERM.

Although we may yearn for "Auld Lang Syne" or "days gone by," the progress on ERM in the insurance industry suggests the best is yet to come.

Jonathan Bilbul, FCIA, FCAS, is a consultant at EMB Consultancy in England. He can be contacted at jonathan.bilbul@emb.co.uk. AR

Actuaries Discuss Their Paths to Cutting-Edge Careers

By Caitlin S. Jennings, CAS Communications Coordinator

"It's 2008. Do you know where your actuarial career is going?"

Regina Berens posed this question during a session at the 2007 CAS Annual Meeting in Chicago. Berens, chairperson of the CAS Long Range Planning Committee and a vice president at Swiss Re, moderated a panel of CAS members whose careers reflect the vision of the CAS Centennial Goal. She opened the session with a photo of her standing in front of the Taj Mahal and the following quote from Talking Heads: "And you may ask yourself: 'How did I get here?'" She explained that if you want to find yourself in a nontraditional career, you must decide to go in new, and sometimes unusual, directions. The panelists' stories reflected this notion, as they offered useful advice on how to advance your career to the cutting edge.

"The CAS will be recognized globally as a leading resource…"

David Bassi was perfectly suited to speak to the vision of CAS members becoming more involved in the international sphere. He currently works in Zurich and has also worked in Boston, Chicago, Kansas City, Raleigh, and Singapore. His team members have worked around the world in Tokyo, Hong Kong, Sydney, Munich, Paris, London, Bangalore, and New Delhi.

Bassi encouraged attendees to embrace interactions with colleagues from around the globe, saying that the experience provides a valuable different perspective. He noted that speaking English is not a big disadvantage, as most international professionals are fluent, and, when they aren't, it is very easy to find translators. Bassi was enthusiastic about the many benefits of having a CAS education when working in a global market, noting that CAS members are recognized as having a strong foundation in P/C insurance, along with a focus on practical techniques and hands-on knowledge of the U.S. market.

"It's 2008. Do you know where your actuarial career is going?"

Bassi warned attendees to be aware of stereotypes of U.S. actuaries. "It's unrealistic for people to be experts in all things American," said Mr. Bassi. Still, many expect a U.S.-trained actuary working abroad to know about all facets of the U.S. insurance industry. Other stereotypes are that CAS members are often lost without data, default to known techniques, and lack theoretical mathematical grounding.

Before making the leap beyond U.S. borders, Bassi suggested carefully considering where you want to go and what you want to gain from the experience. Once you have decided to take your career abroad, make your desire known to your employer (if they are international), actuarial recruiters, or global companies.

"CAS members will…leverage their skills in risk analysis to become recognized as experts in the evaluation of enterprise risks..."

Dave Murray of CNA talked about his interesting career path that led to his work in ERM and provided practical advice to attendees seeking work outside traditional areas of practice.

Murray started as a pricing actuary at CNA, but his interest in the financial side of business led to a bancassurance opportunity with Winterthur International in London. He returned to CNA in 2001 in a corporate role covering risk management and modeling.

Murray suggested letting "your interests pull you along." Keep your eyes open for opportunities. Find a problem that is not getting solved in the areas you are interested in. Educate yourself by studying, networking, learning the language of an area, and monitoring related activity in other industries. Get experience; if you see projects you want to work on, insert yourself into them. "Try things out with real data," he stressed, adding that it's important to test your abilities. Become an expert in something so that you are the person people go to when they need an answer.

Cutting-Edge Careers page 24

Cutting-Edge Careers

From page 23

He concluded by saying that working toward a cutting-edge career has innumerable benefits—interesting work and challenges, a sense of accomplishment and community, and easily met continuing education requirements.

"CAS members will advance their expertise in pricing, reserving and capital modeling..."

The third panelist, Roosevelt Mosley of Pinnacle Actuarial Resources, regretfully had to cancel his presentation due to unforeseen circumstances. However, Mosley shared his advice for this article concerning the path that led him from his start in personal lines ratemaking to advancing his expertise in generalized linear modeling (GLM).

Mosley noted that the opportunities that actuaries have to educate themselves on the subject of GLM have improved over the years. There are now more papers on advanced techniques, sessions at meetings, and even a dedicated seminar on predictive modeling. While there are competing professionals exploring the same space, including mathematicians, statisticians, and MBAs, there are still many opportunities available to actuaries in areas such as ratemaking, claims, marketing, and agency review, not to mention the areas outside of insurance.

To get to the cutting edge, Mosley recommended learning all you can about both current actuarial techniques and techniques used in other industries. Question the limitations of traditional methodologies in order to pave the way for improvement.

His closing advice encompassed ideas presented at the session and in the CAS Centennial Goal: Don't just accept the way it has always been done. Advocate for change and look for a better way. AR

CAS Member Attains Both FCAS and FSA at Age 27

In a November 2005 *Actuarial Review* article Anita Sathe said, "My parents told me I should always believe in my dreams, aspire for something that will have an impact, and chart a course for others to follow in the years to come." The article described her achieving the dual ACAS/ASA accreditation when she was just 25 years old. Now she has a new accomplishment to be proud of. She received the FCAS accreditation at the 2007 CAS Spring Meeting in Orlando and went on to receive her FSA designation a few months later.

Raised in India, Anita became interested in actuarial science and was encouraged by a family friend. After studying in India, she decided to attend the University of Connecticut for graduate school. While there, she was able to get hands-on experience in the actuarial profession. "I was fortunate to be exposed to a variety of real-life actuarial projects through my involvement with the Deloitte-UConn Actuarial Center. Dr. Jay Vadiveloo, who heads up the Center has been one of my biggest sources of inspiration and support throughout my career and was one of the main reasons I chose to work with Deloitte after I graduated from UConn." At Deloitte, she gained an interest in the P&C side of actuarial science and her supervisors encouraged her to also pursue the CAS exams. "Deloitte has been very supportive of my efforts to complete the dual credentials."

Now that she is finished with the exam process, she is looking ahead to what she can do with her dual credentials. "I would love to create a niche for myself in which I do cutting-edge work that utilizes my life [and] P&C insurance knowledge….I think the exams (and therefore the credentials) have taught me how to evaluate various types of risks and ask the right questions to understand the nature of uncertainty I am dealing with. How I make use of these skills…can and will evolve over time. The area is vast and I think the possibilities are unlimited."

Since she is equally interested in life and P&C work, Ms. Sathe has considered a few possibilities that would allow her to continue working in both areas. "It [would] be great to work with an insurance company that writes both life [and] P&C coverages and help them implement an ERM strategy. Another option is to look at coverages offered by life and P&C companies where the risks are similar, but are modeled and managed differently within the two industries, [e.g.,] workers compensation and disability income. [Another possible area] is analysis of aggregate reinsurance covers for companies that buy aggregate reinsurance on their life [and] P&C coverages."

With all the exams completed, Anita is also enjoying some new-found free time. "I love to travel and I have been traveling extensively since November '06 when I took my last exam. Living for the last five years in the New England area, I have never been able to take a trip to see fall colors, since I was always preparing for a fall exam! So that's next on my to-do list." AR

Marathon Man

Andy Kudera is a serious runner, and has been since he was a freshman in high school and made up his mind to trim down his weight. He succeeded admirably, going from 175 pounds to 135 in three or four months over the summer of 1974. Although his weight has crept back up over the years, he is still running, logging close to 60,000 miles since that year.

In 1980, while attending The College of Insurance, he decided to enter the New York City marathon. It was also the first NYC marathon for Alberto Salazar, who won it, beating Andy by more than an hour. Over the next 12 years, Andy continued to run in marathons from time to time in New York and Massachusetts.

Then, in 1992, he read an article about the 50 & DC Marathon Group, whose members attempt to run in all states plus the District of Columbia. The minimum requirement for membership is to have run marathons in 20 states. In 2001 he qualified and joined that group. Around the same time he also joined the 50 States Marathon Club, which broke off from the first group and requires having run a marathon in only ten states. He is still a member of both clubs. Once he set the goal in 1992 at age 32 to run a marathon in all 50 states plus DC, he decided to do it before turning 50. He recently turned 48 and Andy said he can finish a year ahead of schedule "if I do not get injured or do not do anything stupid like run three marathons in 20 days like I did in 2006." Currently, Andy needs three more marathons to fulfill his goal—New Mexico, Texas, and West Virginia.

Perhaps the most attractive (and challenging) aspect of running in all states is the opportunity to see different and beautiful parts of the United States. About the only similarity among the marathons is that they are exactly 26 miles and 385 yards. The locales differ by topography, climate, and scenery. The New Jersey Marathon, which Andy ran in April 2004, is from Sandy Hook to Long Branch. The entire race is relatively flat, as it is run along the Jersey coastline. The biggest variable in that race is the wind off the ocean. The highlight of the race for him came afterward, when his six-year-old daughter said, "Daddy, you didn't look happy when Mommy took your picture." Mommy had taken pictures at mile 21.

Two months later he had a chance to "run with the herd," the local pronghorn antelope, during the first eight miles of the Casper Marathon. The elevation is 5,200 feet above sea level, the heat was 88 degrees, quite unusual for that time of year, and the winds were 25 to 30 miles per hour. It felt like an inferno. Unfortunately he did not get to see any pronghorn during the race. However, two years later Andy was able to see horses while running in the Derby Festival Marathon in Louisville, Kentucky. During parts of the ninth and tenth miles of both the marathon and half-marathon, the course takes a detour through Churchill Downs. Because it was the weekend before the Kentucky Derby, the infield was set up for the Derby and a training race for the horses was going on while the runners trotted through the infield. Then two months later, during the Mayor's Marathon in Alaska, some of the runners were able to observe a moose around mile three. Others were hoping that the bears did not have a craving for power gel during the trail portion of the run.

In the Spirit of St. Louis Marathon, every mile features a "running" work of art created by local area artists. "Mile four is torture as you run through the Anheuser-Busch Brewery but you have to run another twenty-two plus miles before indulging in the product," Andy noted.

The Valley of Fire Marathon in Nevada was by far his most difficult marathon to date. This out-and-back course starts at 1,800 feet and climbs another 1,800 feet during the first ten miles. It then has a nice three-mile downhill before the turnaround. The desert scenery is breathtaking and it is only seventy miles from "Sin City" (Las Vegas).

Some other scenic marathons included Yakima River Canyon in Washington; Grand Island Trail in Michigan, which is run on an island and one has to board a ferry to get to the start; and the Coeur d'Alene Marathon in Idaho. The latter run takes place entirely in Coeur d'Alene, more than half of it along Lake Coeur d'Alene, but with plenty of hills. The volunteers warned him at mile 24 to be careful of heat stroke. At that point it was too late and the warm weather cut into his time at the Coeur d'Alene Brewing Company afterwards. This is one of the best microbreweries in the country, and you have to go to Idaho to try out the brew because Idaho state law does not allow liquor to be shipped across state lines.

Andy has been able to fit two marathons into travel to CAS meetings—Richmond in November 2001 before the Atlanta meeting, and Baton Rouge Beaches in November 2003 before the New Orleans meeting. He does not devote as much time to training as he used to or would like to—less than ten hours per week, running approximately 30 to 35 miles on average now. He used to be able to average between 40 and 45 miles per week with some cross training. He also writes occasional articles about his running for his local running club, from which much of this material was gathered.

Andy Kudera is a Consulting Actuary with Kudera Consulting, LLC in Ridgefield, Connecticut. He is also Vice President-Professional Education of the CAS. AR

GLENN MEYERS

Quantifying Tail Risk with the Gibbs Sampler

As the actuarial profession becomes more involved in enterprise risk management, I sense a great deal of discomfort with estimating quantities that depend on the tail of the distribution. For example, when discussing risk-based capital, many actuaries favor the value-at-risk over the theoretically superior tail value-at-risk because they don't have to calculate probabilities as far out in the tail. A common practice is to fit a distribution to the losses you have, and calculate the value-at-risk. A proposal to calculate the tail value-at-risk using the same distribution is met with the argument—"Because of parameter risk, we have less confidence in estimates of the probabilities of losses further out in the tail."

The purpose of this column is to demonstrate a method of quantifying parameter risk and show how it affects quantities in the tail. Since this is intended to be an introduction to the topic, I will focus on a simple example. But once one grasps the fundamental ideas, it should be easy to generalize this example to more complex applications.

We are given a set of ten losses, {*xi*} = {3,000, 4,000, 5,000, 8,000, 10,000, 14,000, 15,000, 16,000, 22,000, 24,000}. Our assignment is to estimate the expected value of the layer of future losses between 25,000 and 30,000. Calculating the maximum likelihood estimator of a lognormal distribution for these data yields the parameters $\hat{\mu} = 9.194$ and $\hat{\sigma} = 0.723$. Calculating the difference in the limited expected values[1] for the layer boundaries with these parameters gives an estimate of the expected cost of the layer equal to 392.01.

The Gibbs sampler provides a way to simulate the uncertainty in this estimate. Before describing the math, let's look at some results from our lognormal example. First we should note that it is a Bayesian methodology. Figure 1 plots a random sample of 1,000 (μ, σ) pairs taken from the prior distribution. Figure 2 plots a random sample of 1,000 $(\mu, \sigma|\{x_n\})$ pairs from the posterior distribution calculated with the Gibbs sampler.

One can take each of the (μ, σ) pairs in Figures 1 and 2 and calculate the expected cost of the layer. Figures 3 and 4 are histograms of the expected costs in the layer corresponding to Figures 1 and 2. They illustrate the risk of the estimated layer cost due to uncertainty in the parameters before and after looking at the data.

The Gibbs sampler [2] assumes that for any μ, we can generate a random variable $\tilde{\sigma}$ with probability density function $f(\sigma|\mu)$, and that for any σ, we can generate a random variable $\tilde{\mu}$ with probability density function $f(\mu|\sigma)$. Start with an arbitrary value μ_1 and randomly generate σ_1 from $f(\sigma|\mu_1)$. Then continue by randomly generating μ_i from $f(\mu|\sigma_{i-1})$ and σ_i from $f(\sigma|\mu_i)$. The pairs $\{\mu_i, \sigma_i\}$ form a Markov chain and will eventually converge to a stationary distribution with probability density $f(\mu, \sigma)$.

We now turn to simulating samples from the posterior distribution:

$$f(\mu, \sigma|\{x_n\}) = \frac{\ell(\{x_n\}|\mu, \sigma) \cdot f(\mu, \sigma)}{f(\{x_n\})}$$

where $\ell(\{x_n\}|\mu, \sigma) = \prod_i \phi(\log(x_n) \mid \mu, \sigma)$ is the likelihood function for $\{x_n\}$, ϕ is the probability density of the standard normal distribution, and $f(\cdot)$ is the probability density function.

Simulation of μ_i and σ_i is done by the rejection method.[3] To do this you first calculate the maximum likelihood

$$M = \ell(\{x_n\}|\hat{\mu}, \hat{\sigma}).$$

Then for a given μ_i, you generate a random σ_i as follows.

1. Generate σ_R from the prior distribution $f(\sigma|\mu_i)$.
2. Generate U from a uniform (0,1) distribution.
3. If

$$U \le \frac{\ell(\{x_n\} \mid \mu_i, \sigma_R)}{M}$$

then set $\sigma_i = \sigma_R$, otherwise return to Step 1.

For a given σ_{i-1}, you generate a random μ_i similarly.

In our example, the prior distribution of μ is normal with mean = 8 and standard deviation = 1. The prior distribution of σ is lognormal with the mean of $\log(\sigma) = -0.3$ and the standard deviation of $\log(\sigma) = 0.1$. While the Markov chain (μ_i, σ_i) will

1 See Klugman, Stuart A., Harry H. Panjer, and Gordon E. Willmot, *Loss Models,* Appendix A, Wiley 2004, for the formula for the limited expected value for a lognormal distribution.

2 See Ross, Sheldon A., *Simulation*, 2nd Edition, Section 10.3, Academic Press, 1997, for a description of the Gibbs sampler.

3 See Ross, op. cit., Section 5.2 for a description of the rejection method. Translating our notation to Ross' notation, $g(\mu, \sigma) = f(\mu, \sigma)$ and $c = M/f(\{x_n\})$.

eventually converge to the posterior distribution, it can take several iterations to get there. I ran 4,000 iterations in what is called a "burn in period" and the next 1,000 iterations made it into Figure 2. This was done in a program written in R that accompanies the Web version of this article.

Here are some comments on the general applicability of the Bayesian analyses using the Gibbs sampler.

- The methodology is easily extendable to multiparameter models such as those used in stochastic loss reserving.
- Once you have the posterior distribution of the parameters, you can get the distribution of any function of the parameters. In our example, if you are interested in the distribution of outcomes rather than expected layer costs, you can simulate a number of outcomes for each (μ_p,σ_p).
- There is an article in the 1996 *PCAS*, "An Introduction to Markov Chain Monte Carlo Methods and their Actuarial Applications" by David Scholnik that provides a more complete description of the Gibbs sampler.
- There is a lot of software available to help with this kind of analysis. The BUGS (an acronym for Bayesian inference Using Gibbs Sampling) project is one example. An internet search for "WinBUGS" will lead you to more information. I have yet to use WinBUGS. I have found the Gibbs sampler very easy to program and have not felt the need to learn another software package—at least so far.

Yes, we should worry about parameter risk, especially in the tail. Here I have attempted to describe a tool that allows us to do something about it.

Figure 1

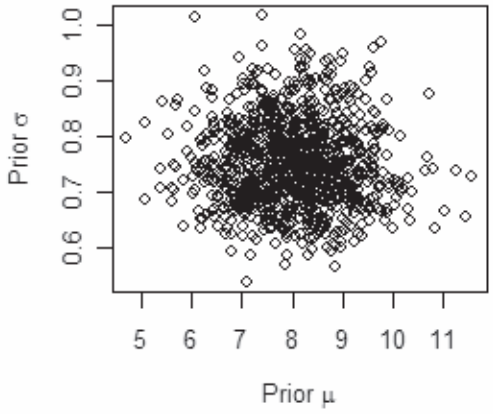


Figure 2

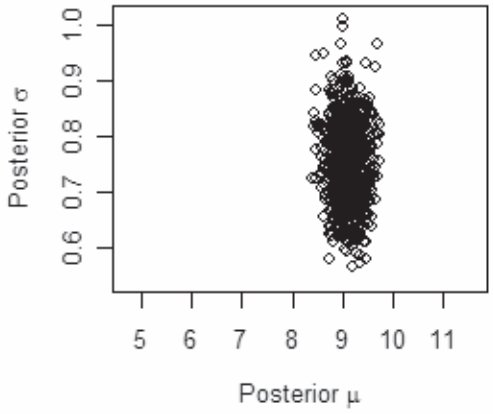


Figure 3

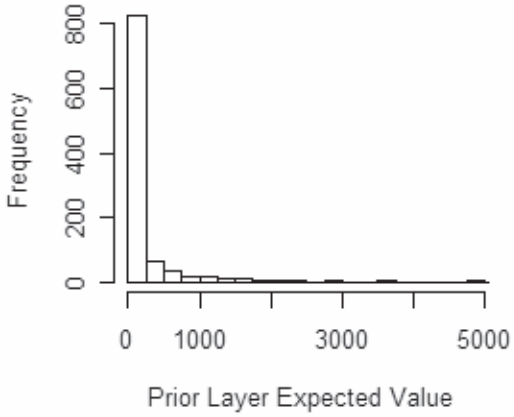
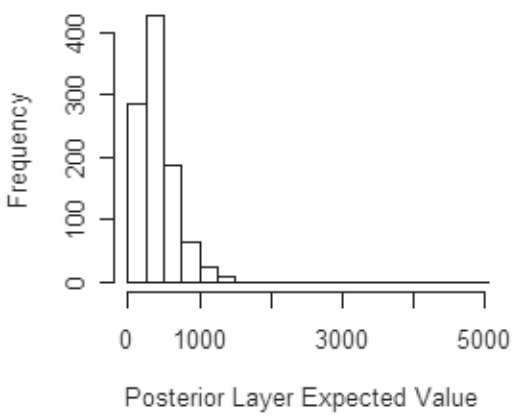


Figure 4



The Top Ten Casualty Actuarial Stories of 2007

By Vince Yezzi and Christina Gwilliam

Once again, CAS thought leaders have been surveyed to identify the ten most significant news stories affecting the casualty actuarial profession. Some topics have been in the limelight for the past few years—enterprise risk management (ERM), predictive modeling, and catastrophe concerns—while others are more specific to 2007—revisions to the American Academy of Actuaries' qualification standards and the subprime mortgage crisis. Concerns about subprime lending made our number four slot, as well as Time.com's list of the Top 10 news stories in the number two slot, highlighting the overlap between actuarial concerns and the larger global context. While the top 10 stories were generally U.S.-focused, responses displayed the broadening worldview of CAS members as votes were cast for stories about outsourcing of actuarial jobs to India and China and Solvency II capital requirements in the U.K.

Here is the top ten listing for 2007:

10) Standard and Poor's (S&P) to Expand Credit Review Process to Include Analysis of ERM

In 2006, S&P added an assessment of ERM to its rating criteria for insurance companies; in 2007 it has expanded the ERM assessment to nonfinancial companies as well. These actions will put increased focus and higher priority on ERM in insurance companies and corporations. The question for CAS members is whether we will be active and integral participants in the ERM process or mostly bystanders observing other professionals leading the effort.

9) Quiet Hurricane Season—What's Next?

While the U.S. hurricane season was relatively quiet in 2007, wildfires destroyed parts of California, the U.K. was hit with the worst flooding in years (resulting in £1 billion sterling in losses), and Cyclone Sidr took thousands of lives in Bangladesh. Actuaries working in the modeling field are facing questions related to U.S. hurricane model overreaction to the 2004 and 2005 storm seasons. In addressing these concerns, modeling actuaries as well as pricing actuaries will need to grapple with long-term weather cycles and the reality that actual experience in a particular year will most likely vary from the long-term average due to the high severity, low frequency nature of catastrophes. Lastly, opportunities exist to improve not only the current models and techniques but also to develop new models for additional perils worldwide.

8) Increased Use of Stochastic Reserving Techniques Aim to Quantify Uncertainty

Regulators, rating agencies, and the SEC have been pushing insurance companies to disclose a range of estimates in an effort to illustrate the uncertainty in booked loss liabilities. Actuaries are increasingly turning to stochastic models rather than simply looking at a range of methods or using a varying percentage off of a base selection. Actuaries need to develop a full understanding of the stochastic models: how to apply them, judgmentally adjust them, and interpret their results.

7) Fair Value Accounting—The World is Getting Smaller with Convergence of the IASB and FASB

Actuaries in financial reporting have had a busy year with actions taken by the Financial Accounting Standards Board (FASB), International Accounting Standard Board (IASB), and the SEC. FASB promulgated FAS 159, "The Fair Value Option for Financial Assets and Financial Liabilities," which allows entities to choose to report on a fair value basis. Meanwhile the International Accounting Standard Board (IASB) published "Preliminary Views on Insurance Contracts," which aims to promote a public discussion. The IASB identifies three building blocks: a market-consistent estimate of cash flows, a current market discount rate, and an explicit risk margin. The SEC has already proposed to allow non-U.S. companies to file U.S. financial reports using International Financial Reporting Standards (IFRS) instead of Generally Accepted Accounting Principles (GAAP), and is considering whether to allow U.S. companies the same choice. Fair value is no longer an idea for the distant future but is a concept to which U.S. actuaries need to devote their talent and expertise.

6) Growth in ERM Provides Leadership Avenues for CAS Actuaries

As ERM continues to take a more prominent role in insurance companies, executive positions such as chief risk officer and strategic risk manager are being created. Actuaries

Actuarial Top 10 page 30

The Top Ten Casualty Actuarial Stories—How They Ranked and Why

Rank	News Story	Actuarial Significance	Score	#1 or #2	Total
1	American Academy of Actuaries introduces new qualifications standards	Actuaries need to adapt to the new, broader definition of work product and the increased time requirements for continuing education, to maintain the profession's high reputation.	634	21	53
2	Softening market: Property and Casualty rates decline for third year	Actuarial influence in pricing discipline.	625	23	50
3	Predictive modeling expands beyond personal lines pricing into commercial lines and claims management	Actuaries apply their data-mining knowledge, gleaned from personal lines pricing, to commercial lines rating and claims processes.	512	10	47
4	Mortgage/Credit crisis affects insurance products and insurer investment portfolios	Actuaries must quantify the potential impact on D&O policies covering lending institutions and hedge funds, and also consider the impact of subprimes on insurer investment portfolios.	463	13	38
5	U.S. Supreme Court reviewing credit scores in insurer personal auto pricing	As use of credit score continues to rise, more actuaries will be involved in products that use this pricing variable.	425	7	39
6	Growth in ERM provides leadership avenues for CAS actuaries	Chief risk officers rely on actuaries to quantify risks and to function as an integral part in strategic business decisions, assessing full array of risks facing organizations.	391	5	37
7	Fair Value Accounting—the world is getting smaller with convergence of IASB and FASB	With the adoption of FAS 159, actuaries must stay abreast of financial reporting changes such as the SEC allowing non-U.S. companies to file U.S. financial reports using International Financial Reporting Standards instead of GAAP, and the IASB publication "Preliminary Views on Insurance Contracts."	363	11	33
8	Increased use of stochastic reserving techniques aimed to quantify uncertainty	Application of established statistical methods to loss reserving requires training for actuaries as well as their audience.	318	1	35
9	Quiet hurricane season—what's next?	How actuaries will position themselves, with the related questions about hurricane model overreaction.	294	3	28
10	Emerging Issue: Standard and Poor's to expand credit review process to include analysis of ERM practices for nonfinancial companies	Enhanced approach requires actuarial quantitative analyses and modeling to assess risk magnitudes and expected outcomes; the ability of the corporate client to manage volatility is key.	273	3	28

are uniquely qualified to provide valuable input on strategic decisions facing insurance companies, in either filling these positions or providing guidance to those in the positions. One ongoing challenge facing actuaries will be to convert the results of complex models into understandable and useful information for the end-users of their analyses.

5) U.S. Supreme Court Reviewed Insurer Use of Credit Scores in Personal Auto Pricing

In June the U.S. Supreme Court ruled that two insurance companies did not willfully violate the Fair Credit Reporting Act (FCRA) in their practices related to personal auto pricing. The ruling clarified when an adverse action notice is required to comply with the FCRA. This decision was a "win" for the insurance industry because it eliminated a potential liability for millions in punitive damages for failing to comply with the FCRA. This outcome should allow insurers to expand the use of credit scores in other business segments and will likely create additional opportunities for actuaries.

4) Subprime Mortgage Crisis Affects Insurance Products and Insurer Investment Portfolios

The use of sophisticated forecasting techniques to project default rates, as well as input on ERM processes, are some of the actuarial skills that may have helped to mitigate the damage. As it stands, this crisis will have a number of impacts on casualty actuaries. First, the investment returns for insurance companies will be adversely affected to the extent that companies have investments in mortgage-backed funds. Second, there will be reserving challenges for actuaries in many lines of business, including mortgage, homeowners, D&O, and possibly E&O.

3) Predictive Modeling Expands Beyond Personal Lines Pricing into Commercial Lines and Claims Management

Predictive modeling made the list for the third straight year and continues to expand into areas beyond personal lines pricing. Using the data-mining techniques gleaned from personal lines on commercial lines products presents additional challenges for a number of reasons: the exposure tends to be more heterogeneous and the data is less voluminous. Insurers are also applying predictive modeling techniques to claim department processes to provide guidance in assigning new claims to adjusters and offices, setting formula case reserves, identifying fraud, and conducting utilization reviews of third parties such as TPAs and outside attorneys.

2) Softening Market: Property and Casualty Rates Decline for Third Year

The decline in pricing for commercial property/casualty markets continues to accelerate. In the personal lines arena, auto rates continue to drop, though at a slower pace, while the homeowners line shows price increases. At the same time, the industry is reporting favorable combined ratios. All of this will result in considerable pressure on actuaries to reduce rates. The challenge will be for actuaries to balance sound underwriting and pricing discipline with controlled growth in the face of market forces where volume is the pricing goal.

1) American Academy of Actuaries Introduces New Qualifications Standards

Though not in effect until January 1, 2008, the revised qualification standards were judged to be the most relevant news story of 2007. The new rules broaden the definition of actuarial workproduct beyond GAAP and statutory Statements of Actuarial Opinions and increase the number of continuing education hours from 24 hours every two years to 30 per year. The Academy's goal in introducing the revised standards is to enhance the reputation of the profession. Actuaries must do their parts to fulfill the requirements and uphold the high esteem the profession currently enjoys.

The accompanying chart summarizes the results of the survey. Scoring was as follows: fifteen points were awarded to a story for each first place vote, down to six points for a tenth place vote.

We compared the consensus top ten stories with the individual responses to determine which respondent most closely matched the group result. This year's winner, Mike Wiseman, selected seven of the consensus top ten stories. Steve Rominske and Eugene Connell tied for second place.

Thanks to all who participated in the survey. AR

Actuarial Haiku

All my reserving
In Excel before my eyes
"Save" before blue-screen

Study time nearing
Collect my books and papers
Once again I'm sad

"You may begin now"
Questions spread out before me
Just four hours to go...

Solvency issues
Difficult conversations
This is what we do

Loss development
Many tools within our bag
No one estimate

CAS holds a meeting
Need to get all those credits
Is it in Vegas?

Deadline's approaching
Must finish it before noon
Can you see the sweat?

Who's the new student?
He passed three in one sitting!
Meet your future boss

Is the pass list out?
Hit "refresh" and hold your breath
Thank God that's over

We have good jobs now
Big promotions on the way
It was all worth it

Courtoon

By Jeff Adams

Casualty Actuarial Development in China

By Alex Zhu, Member, Asia Regional Committee

Powered by the dynamic modernization of the Chinese economy and society, casualty actuarial practice is being rapidly integrated into insurance company operations in China. The Chinese Actuarial Association (CAA) became an independent actuarial organization in December 2007 after the final government registration process was completed.

Economic Growth Fuels the P&C Insurance Market

China is the fourth largest economy and has the largest foreign currency reserves in the world. For the first time, the World Bank predicted that China will become the largest contributor to the global economic growth. China has become a powerful developing country with increasing global influence. Starting in the 1980s, the communist government under Deng Xiao Ping pursued far-reaching changes that expanded commercial and technical ties to the industrialized world and increased the role of market forces in stimulating urban and rural development. The Chinese economy has achieved around 10% average annual growth in GDP since 1979.

China's accession to the WTO in December 2001 has also contributed to the growth in foreign trade and foreign direct investment, while further intensifying the domestic corporate restructuring process. In 2002, China surpassed the U.S. to become the country that absorbed the most foreign direct investment in the world. The growth story continues with the economy expected to grow 11.5% in 2007.

Rapid economic growth, coupled with strong foreign investment, has resulted in substantial wealth creation and accumulation in China. As disposable incomes rise, consumers have looked to insurance policies to protect their assets.

China's property/casualty (P&C) insurance market is the 11th largest in the world. The following table sets forth the insurance premium received by P&C insurance companies in China from 1997 to 2006.

Property/Casualty Insurance Premium in China

Currency: US$ million

Year	Premium	Growth Rate
1997	5,798	
1998	6,040	4.17%
1999	6,293	4.20%
2000	7,319	16.31%
2001	8,347	14.04%
2002	9,340	11.89%
2003	10,463	12.03%
2004	13,587	29.86%
2005	15,875	16.84%
2006	20,238	27.49%

While the Chinese P&C insurance market has experienced rapid growth, it remains significantly under-penetrated when compared to more developed markets in Asia as well as the U.S. and Europe. In 2006, total P&C insurance premiums represented only 1% of China's GDP, compared to about 2.2% in Japan and 4.8% in the U.S.[1] The comparatively low penetration rate suggests potential for further growth in the Chinese insurance market.

1 All data from Swiss Re's Sigma Report, issue 4-2007.

Roots of the Casualty Actuarial Profession

In 1988, a joint actuarial program between the Society of Actuaries (SOA) and Nan Kai University kick-started actuarial education in China, introduced modern actuarial concepts and practices to the Chinese insurance industry, and prepared the first wave of young actuaries in China. Focused on life actuarial practices, today the graduates of the SOA-Nan Kai University program work in many life insurance companies in China. The 1995 insurance law mandating that life insurance companies in China employ actuaries gives a major push to the budding actuarial profession and attracts a number of bright candidates into the actuarial career. In 1999, 43 actuaries were awarded the rank of Fellow after passing qualifying exams by China Insurance Regulatory Commission (CIRC), China's national insurance regulator. In 2001, the Society of Actuaries of China was formed under the China Insurance Association.

Before 2000, casualty actuarial knowledge in China was generally limited to life actuarial education's coverage of the subject. Around 2000, a few internationally qualified casualty actuaries visiting China and academic professors started to preach the gospel of modern casualty actuarial knowledge and practice, such as the powerful roles they played in the operations of multinational P&C insurance companies and in casualty insurance companies in the U.S, U.K, and Australia. These enlightening activities and subsequent educational efforts took place spontaneously across China, bringing the audience to a new world beyond the chain-ladder method.

To solve the problem of an acute shortage of qualified casualty actuaries, the national regulator administered special casualty exams. On March 26, 2007, for the first time in history, Casualty Fellowship certificates were awarded to 22 casualty actuaries in China after they successfully completed the exams. These Fellows became the founding members of the CAA.

Regular CAA Associateship exams, a separate track under the Chinese actuarial exams, were first offered in 2005 and are given twice a year in spring and fall. The first five exams are required of both life and P&C actuarial candidates, and P&C candidates need to take another four casualty topic exams to complete Associateship exams. The Chinese exams aim to be similar to Casualty Actuarial Society exams in the breadth and depth of the subject. Instead of being composed of numerous essay compilations, Chinese casualty actuarial exam materials are textbooks written by commissioned university professors based on a syllabus developed by a committee of regulators, practicing actuaries, and academics. Fellowship exams are in an early stage of development. Quite a number of candidates are taking CAS exams.

After an extensive study of casualty actuarial science and practices, the national insurance regulatory officials at CIRC led the effort to include in the 2003 Insurance Law a provision requiring P&C insurance companies to employ casualty actuaries. On July 1, 2004, a regulation was implemented requiring each P&C insurance company to designate a qualified actuary as appointed actuary, subject to regulatory approval. Actuaries qualified under Chinese exams and internationally qualified actuaries, such as CAS Fellows, are eligible to be appointed actuaries for P&C insurance companies in China. Appointed actuaries are required to sign product filings, actuarial statement of reserves opinions, and solvency reports. Casualty actuaries are primarily engaged in pricing and reserving activities, with some playing leading roles in investment and company risk management. Actuarial sophistication varies tremendously from one company to another.

In addition to the standard loss ratio and pure premium methods, some pricing actuaries use Emblem and SAS as their primary pricing software. Actuarial reserving based on GAAP became mandatory starting January 1, 2007, as part of the 2006 Chinese accounting standard developed for all industries, which is similar to International Financial Reporting Standard 4. The accounting standards for P&C insurance companies in China are quite close to U.S. Statutory Accounting Principles, including not allowing deferred acquisition costs.

The Players: P&C Companies in China

China's P&C insurance market is currently dominated by The People's Insurance Company of China (PICC), China Pacific, Ping An, and China United, which together control over 70% of the market in terms of gross written premiums in 2006. PICC is by far the largest P&C insurance company with over 40% of market share and was formerly the monopoly insurer in China. There are 43 P&C insurance companies licensed in China, 27 domestic and 16 multinational. Multinational P&C insurance companies take 1% of the market share. The five largest multinational insurance companies in terms of gross written premium are AIU, Tokyo Marine, Sumitomo Mitsui, Samsung, and Allianz.

Rapid Growth = Increased Demand

With the rapidly growing business and the increasing number of P&C insurance companies, the demand for sophisticated casualty actuaries is intense, and there is a severe shortage of qualified actuaries. The tasks of establishing actuarial practices in an environment lacking clean data and of educating non-actuarial colleagues are formidable challenges. Because of the dedication and enthusiasm flowing through this young profession and the remarkable results achieved within a short span of time, the P&C business is growing up very fast in China—and CAS Fellows have played a leading role in its development.

Alex Zhu is chief actuary for Ping An Property & Casualty Insurance Co. in Shenzhen, People's Republic of China.

Actuarial Foundation Update

Nominate Someone Today!

Nominations for the following two prizes must be submitted by March 15, 2008:

Wynn Kent Public Communication Award

To honor Wynn Kent, his family and friends set up the Wynn Kent Public Communication Award, which is given out annually to recognize a member of the actuarial profession who has contributed to the public awareness of the value of actuarial science in meeting the financial security of society in the fields of life, health, casualty, pension, and other related areas. For more information or to nominate someone for a Wynn Kent Award visit www.actuarialfoundation.org/research_edu/wynn-kent-award.html.

John Hanson Memorial Prize

The John Hanson Memorial Prize award was established in honor of John Hanson, whose papers on pension funding and accounting set the standard for this important topic. The prize is awarded for the best paper on an employee benefits topic. For more information or to nominate a paper visit www.actuarialfoundation.org/research_edu/john-hanson-submission-form.html.

Foundation Scholarships Available

Do you know an actuarial student who could use a little extra money for school? The following scholarship applications are now available on the Foundation's Web Site:

- John Culver Wooddy Scholarship: http://www.actuarialfoundation.org/research_edu/prize_award.htm#wooddy
- Actuary of Tomorrow—Stuart A. Robertson Memorial Scholarship: http://www.actuarialfoundation.org/research_edu/prize_award.htm#robertson

Bring Your Love of Math to a Classroom Near You!

The second semester has started and actuarial mentors are needed! Check out the Actuarial Foundation Web Site to see if there is an Advancing Student Achievement math mentoring program in your area. For details, see www.actuarialfoundation.org/youth/call_for_mentors.htm.

You can also help students improve their math performance with supplemental math materials developed by The Actuarial Foundation. Download a copy and present it to a classroom or school in your area. Visit http://www.actuarialfoundation.org/youth/call_for_mentors.htm for more information.

The Actuarial Foundation Partners With Junior Achievement of New York

The Actuarial Foundation will recruit and Junior Achievement of New York (JANY) will train and place actuarial volunteer mentors in New York City middle and high school classrooms. The volunteer mentors will be trained to deliver the following programs:

1. JA Economics for Success explores personal finance and students' education and career options based on their skills, interests, and values.
2. JA Global Marketplace teaches practical information about the global economy and how international trade affects the students' daily lives.
3. JA Economics examines the fundamental concepts of micro-, macro-, and international economics.
4. JA Titan is an interactive online business simulation program that provides a unique, fun, and exciting opportunity to learn about business and economics. Through this simulation, students learn how to make decisions on price, production, capital investment, marketing, and research and development for the fictional HoloGenerator industry.

If you are interested in volunteering, please contact Debbie McCormac at debbie.mccormac@actfnd.org or call (847) 706-3600.

ERM Perspectives

Editor's Note: Due to space considerations, only the discussion of theme 1 appears in the print edition of the *Actuarial Review*. The complete column can be found in the online edition available on the CAS Web Site.

Timing is everything and these are exciting times for chief risk officers. The subprime phenomena has led to such visibility that you can't open a newspaper these days without mention of a firm's ability or, all too frequently, its inability to manage its risk. And that's where we can step in. We're the risk people!

And as always, risk creates opportunity. Personal risk is high as boards and regulators probe the adequacy of risk measures and controls. Even CEOs have been fired. But the opportunity to contribute to a firm's value is greater than ever with all of the focus on identifying and quantifying risk, whether in appropriately valuing assets and liabilities for extreme scenarios, managing limits for a firm's risk profile to minimize the next problem, and bridging the various risk elements to create a truly enterprise view. Fortunately, CROs have now typically made it to the "C" suite, which is critically important for access to information and the ability to ensure remedial actions are actually implemented. But the challenge now, in these times, is staying in the "C" suite and balancing personal risk management with the enterprise's risk management.

Personal experiences always influence our perspective and in my case I was fortunate to see just how an engaged CEO and board, with a real commitment to risk management, can build real value. Zurich Financial Services (ZFS) went through a "near death experience" in 2002 with financial guarantees emerging from the woodwork, reserve inadequacies, little data on risk accumulations on the underwriting and investment side, subsidiaries operating very independently, and on and on. Jim Schiro entered as CEO and immediately launched a large number of critical improvement actions, including raising capital, selling assets, implementing expense measures, and putting a focus on core businesses and systems. And one of these critical initiatives was a solid mandate to build a state-of-the-art risk management program and embed it in the organization. Thereafter, in every move we made, we always knew we had the full backing and support of our CEO. That's unquestionably the single most important key to success in implementing a risk management framework.

In June 2007, five years later, S&P returned ZFS to "double A" status, and in its press release particularly noted improvements in risk controls and management. Then in October 2007, it was announced that Jim Schiro would receive an award from St. Johns University as "Insurance Leader of the Year," which singularly noted that he was an "exceptional leader with a comprehensive view of risk taking and risk management." This showed me that during all that time, when we had our meetings and he was looking at his Blackberry, he really was listening!

This column will address three themes:

1. Successfully embedding ERM in the firm
2. Developing models and setting parameters
3. Incorporating and supporting the latest ERM research

1. Embedding ERM in the Firm

Most critical to embedding ERM in the firm is the interest and involvement of the board of directors. Today that might not be an issue, but today's risk failure headlines won't always be at the top of the mind.

Risk tolerances, and how the firm monitors compliance with the agreed tolerances, are a good starting point as they are at the heart of the board's governance responsibilities and, as a practical matter, the discussions quickly become engaging. Basic questions should address what the board wants for maximum volatility, quarterly or annually, in an agreed period of time (e.g., one in ten years), in the following areas: net income (posting a loss, for example), ability to maintain dividends, solvency and rating agency capital at levels not impacting operations or strategic initiatives, and franchise value (performance vs. peers).

These are followed by more intriguing questions, such as how to balance a maximum loss on a hurricane vs. an operational risk loss. Or consider foreign exchange trading vs. non-investment grade bonds. All affect the balance sheet the same way but the perceptions from the investors may well be vastly different. Thinking through the *New York Times* test, with the goal of avoiding the "whatever were they thinking" questions, also makes for good engagement with the board.

The board sets the tolerances at the highest level. The risk framework then extends this tolerance to units at the operating level, with the intent of providing transparency and an internally consistent framework. Generally this leads to a risk policy with internal limits on almost everything, at unit and divisional levels, and that allows such limits to be actionable and monitored at the

Random Sampler page 36

Random Sampler From page 35

lowest levels. It's the risk modeling and the risk management function that ensures and reports that the actionable limits, when aggregated across the firm, reasonably meet the risk expectations implicit in the board's high-level tolerances. It's also important for the board to review and agree on the internal operating risk limits, again, to engage the limits, but also to provide an element of clout within the firm to ensure adherence.

Another measure to engage the board is what we call total risk profiling. This is a structured exercise with a senior management group that develops and evaluates scenarios for risk implications and reviews remedial plans and the status of agreed-upon follow-up actions. Including the board and senior management provides for the broadest views on stress scenarios and is a solid way to get real involvement and ownership. This is key to considering bold scenarios, as the CFO of Goldman Sachs recently remarked, "The lesson you always learn is that your definition of extreme is not extreme enough." You need the leadership and involvement from the top to try to identify Donald Rumsfeld's "unknown unknowns"…the risks "we don't know we don't know."

"The lesson you always learn is that your definition of extreme is not extreme enough. You need the leadership and involvement from the top to try to identify Donald Rumsfeld's 'unknown unknowns'… the risks 'we don't know we don't know.'"

Discussions of emerging risks are an important element. We must consider not just which ones might in fact emerge (e.g., nanotechnology, climate change, pandemics, cell mutations) but also why they might be relevant to our firm. We must also consider major changes in foreign exchange or the credit markets—how might they be relevant? The CRO needs to do the homework, of course, on the stress scenarios and relevant exposure numbers, but such an exercise is a good way to embed risk management in the organization. If the "top dogs" at the board level do it, you can quite effectively get the businesses to emulate the exercise at their levels and to stiffen up the scenarios they consider. Then you can really harness the creative power of the organization.

With the board involved and demanding information, the mandate is there to establish risk committees at all levels in the organization. Designated CROs, too, even if not full time, should organize the risk activities, including the risk profiling, reviewing risk exposures vs. risk policy limits, measuring progress on remedial actions, and providing relevant information upwards. The breadth provides an important comfort to management and the board, but it's also valuable in embedding the risk culture in the organization.

The enterprise view necessarily requires bridging the silos in an organization. My experience is that it is best if the CRO allows each functional area to carry out its own risk management. While risk management coordinates these risk management activities, ensuring rigor and that the limits fit the overall risk profile, I advise leaving responsibility for the day-to-day risk oversight in the specific risk area. Why? It is important to assign ownership within the area and then risk management can be the "auditor" and keep its primary focus on correlations, aggregations, modeling, and scenarios at the enterprise level, which are at the heart of an ERM program and where the real value is added.

Operational risk (including business continuity management) is another way to increase awareness and involve local management. Subtleties such as allocation to line and geographical unit help to strengthen the reliability of data collection, for example, and ensure other follow-through actions are implemented. More important than the rigor, though, is the idea that you are doing allocations and that makes it important, and so actions follow. If there are no consequences, then it becomes a "nice to-do." Operational risk losses can have greater consequences than, say, a hurricane loss—one is our business and the other is a sign of weak controls and management. This sends a tough signal to the markets.

Collectively, actions like these engage the board and drive ERM into the organization. Nirvana is when the audit committee (or finance committee) gets so engaged with risk issues that the board decides to create a risk committee…which ZFS did in 2006.

To read this article in its entirety, visit www.casact.org.

Wayne H. Fisher is executive director of the Enterprise Risk Management Institute International.

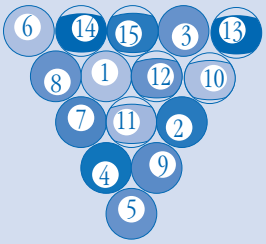
Double Crostic—Unknowns

The accompanying double crostic on page 38 is the third for the *AR* crafted by Alan Putney. Recall that the first letters of the answers to the clues give the author and the title of the work.

Lots of Differences of Pool Balls

The puzzle was to find a difference triangle using pool balls, so there would be five rows and each of the integers 1 to 15 is used exactly once. For extra credit, show how a solution could be found without using a computer.

David Oakden found the (essentially) unique solution:



He summarized his noncomputer solution as follows. 15 must be on the top row. With symmetry there are three possibilities.

14 must be on the top row, or 1 must be beside 15, putting 14 on the second row. Depending on the placement of 15, there can be up to 6 choices.

13 must be on the top row or below 14 or 15. 13 cannot be on the third row and if 14 is on the second row then 13 must be on the top row. Generally the placement of 13 is quite limited.

12 must be on the top row or below 15, 14, or 13. And so on.

There are a lot of possibilities to check but most can be eliminated quickly. The following fact was helpful in eliminating combinations quickly. If two numbers are in the same row and the number between them is smaller or larger than both, then their difference will be two rows below. Since many of the numbers above differ by 1, many arrangements create multiple 1s. For example, 3 *n* 14 *n* 15 (where *n* represents any number) is impossible since there will be two 1s two rows below.

Damon Raben and David Uhland submitted non-computer-assisted solutions. Alex Bodewig, John Herder, Alex Kozmin, Dale Riemer, and Rick Sutherland also submitted solutions. AR

Hartman Takes the Helm of IAA

IAA Past President Hillevi Mannonen (left) congratulates Dave Hartman on his election as president of the International Association of Actuaries (IAA). Hartman took office on January 1, 2008, and will serve for one full year. The restructured IAA will celebrate its tenth anniversary in Québec City in June 2008. Plans for the IAA this year include publishing a Decennial Report that will include the organization's accomplishments over the first ten years; adopting vision, mission, and values statements; and developing and adopting a strategic plan.

ALAN PUTNEY

Double Crostic—Unknowns

The clues:

A.	230 288 337 183 55 83 262 310 120 274 27 153 305	Boring vocal style (2 wds)
B.	302 260 74 339 169 1 311 100 321 236 200 36 316 131	Literary credit
C.	101 185 71 228 132 212 317 284 32	Pondered anew
D.	33 4 330 252 121 62 194 238 84 161 298	Boston and Hartford in olden days (2 wds)
E.	133 250 283 303 58 111 155 341 191 85 26	Fraternal embryos (2 wds)
F.	105 312 28 151 76 258 294	Massage
G.	65 175 112 202 273 139 242 29 295 82	Loss of a limb
H.	335 10 118 217 259 53 189 81 285 149	Party favor
I.	268 327 225 107 16 67 43 92 182 141	Himalayan mountain of the goddess
J.	108 226 281 41 237 5 272 318 205 80 138 178	Bubbly
K.	257 192 12 52 224 309 154 333 325 319 277 90 241	Prestidigitation (3 wds)
L.	180 336 13 245 208 104 299 44 142 61	Colonial ammunition (2 wds)
M.	204 271 78 229 17 45 137 322 171	Objective or Purpose
N.	30 222 246 167 280 87 148 206 136 314	"Hybrid Theory" group (2 wds)
O.	126 97 239 156 59 263 14 197 292	N. Mex. St. basketball coach (2 wds)
P.	56 19 114 88 173	Funny bone joint
Q.	216 6 256 46 170 130	Fame
R.	23 209 163 89 125 248	Tribal gathering
S.	40 306 117 293 2 326 91 63 179 267 223 198 150	NASA specialty (2 wds)
T.	244 103 3 70 176 38 218 270 134 332	Extreme fatigue
U.	177 143 213 11 47 66	Scandalous or wicked
V.	15 203 144 102 48 251	Hospital employee
W.	221 147 77 278 109 35 296 253	Business District
X.	49 275 158 7 98 215	Consider analogous
Y.	287 106 334 64 24 168	Unit of force
Z.	42 145 181 328 307 247 113 75 214 9 282	Printing press supplier (2 wds)
AA.	315 297 8 276 93 140 39 196 227 340 166	TV remote option (2 wds)
AB.	261 291 207 69 254 122 152 34 320 94 231 184 127	Important and definitive
AC.	234 165 25 301 95 201 264 187 146 110 60 329 269	A hotdog on the run (2 wds)
AD.	219 190 50 116 164 265 243 96 233 128 193 342 331 73 313	Manet or Picasso painting (2 wds)

The clues (continue):

AE.	266 188 31 159 338 279 99 235 72 129 308 300 211	What not to do in Mexico (3 wds)
AF.	232 199 290 86 37 324 124 68 172	Andy Griffith co-star (2 wds)
AG.	20 162 57 123	Cheerful and optimistic
AH.	174 220 304 135 21	Result
AI.	343 255 18 240 160 195 323 54 115 286	Graceful strut (2 wds)
AJ.	119 79 186 289 51 210 249 157 22	Richard Rodgers' specialty (2 wds)

Fax your solution to (703) 276-3108 or e-mail it to ar@casact.org.

B.	1	S.	2			T.	3	D.	4	J.	5	Q.	6			X.	7			AA.	8	Z.	9	H.	10	U.	11	K.	12	L.	13	O.	14	V.	15	I.	16	M.	17	AI.	18
P.	19			AG.	20	AH.	21	AJ.	22	R.	23	Y.	24	AC.	25	E.	26	A.	27	F.	28	G.	29	N.	30	AE.	31	C.	32	D.	33			AB.	34	W.	35				
B.	36	AF.	37	T.	38	AA.	39	S.	40	J.	41			Z.	42	I.	43	L.	44	M.	45			Q.	46	U.	47	V.	48			X.	49	AD.	50	AJ.	51	K.	52	H.	53
AI.	54	A.	55	P.	56	AG.	57			E.	58	O.	59	AC.	60	L.	61	D.	62	S.	63	Y.	64			G.	65	U.	66	I.	67			AF.	68	AB.	69	T.	70	C.	71
				AE.	72	AD.	73			B.	74	Z.	75	F.	76	W.	77			M.	78	AJ.	79	J.	80			H.	81	G.	82	A.	83	D.	84	E.	85			AF.	86
N.	87	P.	88	R.	89	K.	90	S.	91			I.	92	AA.	93			AB.	94	AC.	95	AD.	96			O.	97	X.	98	AE.	99	B.	100	C.	101			V.	102	T.	103
L.	104	F.	105	Y.	106	I.	107	J.	108					W.	109	AC.	110	E.	111			G.	112	Z.	113	P.	114	AI.	115	AD.	116	S.	117			H.	118	AJ.	119		
A.	120	D.	121	AB.	122	AG	123			AF.	124	R.	125	O.	126	AB.	127	AD.	128	AE.	129	Q.	130	B.	131			C.	132	E.	133			T.	134	AH.	135	N.	136		
		M.	137	J.	138	G.	139	AA.	140	I.	141	L.	142	U.	143	V.	144	Z.	145			AC.	146	W.	147			N.	148	H.	149	S.	150	F.	151	AB.	152	A.	153	K.	154
		E.	155	O.	156	AJ.	157			X.	158	AE.	159	AI.	160	D.	161	AG.	162	R.	163	AD.	164			AC.	165	AA.	166	N.	167	Y.	168	B.	169	Q.	170	M.	171	AF.	172
				P.	173	AH.	174			G.	175	T.	176	U.	177	J.	178			S.	179	L.	180	Z.	181	I.	182	A.	183	AB.	184	C.	185			AJ.	186	AC.	187	AE.	188
		H.	189	AD.	190	E.	191	K.	192	AD.	193	D.	194	AI.	195			AA.	196	O.	197			S.	198	AF.	199	B.	200	AC.	201	G.	202	V.	203	M.	204	J.	205	N.	206
AB.	207	L.	208					R.	209	AJ.	210	AE.	211			C.	212	U.	213	Z.	214	X.	215	Q.	216	H.	217	T.	218	AD.	219	AH.	220	W.	221	N.	222	S.	223	K.	224
		I.	225	J.	226			AA.	227	C.	228	M.	229			A.	230	AB.	231	AF.	232	AD.	233	AC.	234	AE.	235			B.	236	J.	237	D.	238	O.	239	AI.	240	K.	241
				G.	242	AD.	243	T.	244			L.	245	N.	246	Z.	247	R.	248	AJ.	249			E.	250	V.	251	D.	252	W.	253	AB.	254	AI.	255	Q.	256	K.	257		
F.	258	H.	259			B.	260	AB.	261	A.	262	O.	263	AC.	264	AD.	265			AE.	266	S.	267	I.	268	AC.	269	T.	270	M.	271	J.	272			G.	273	A.	274		
		X.	275	AA.	276	K.	277	W.	278	AE.	279	N.	280	J.	281	Z.	282			E.	283	C.	284	H.	285			AI.	286	Y.	287	A.	288	AJ.	289	AF.	290			AB.	291
O.	292	S.	293	F.	294	G.	295	W.	296	AA.	297	D.	298			L.	299	AE.	300	AC.	301	B.	302	E.	303	AH.	304	A.	305			S.	306	Z.	307					AE.	308
K.	309	A.	310			B.	311	F.	312	AD.	313	N.	314	AA.	315	B.	316	C.	317			J.	318	K.	319	AB.	320	B.	321	M.	322	AI.	323			AF.	324	K.	325		
S.	326	I.	327	Z.	328			AC.	329	D.	330	AD.	331	T.	332	K.	333	Y.	334	H.	335			L.	336	A.	337	AE.	338	B.	339	AA.	340	E.	341	AD.	342	AI.	343		

Second Issue of *Variance* Now Available

The second issue of *Variance: Advancing the Science of Risk* has been released. Read below to learn more about the papers you can find in this issue.

In "**Capital Structure, Solvency Regulation, and Federal Income Taxes for Property-Casualty Insurance Companies**," Sholom Feldblum discusses banks' risk-based capital (RBC) standards and how moving to an RBC model benefits all parties: policyholders pay lower premiums, insurers have access to wider capital markets, and regulators gain market allies to ensure solvency.

Over the past twenty years many actuaries have claimed and argued that the chain-ladder method of loss reserving is biased; nonetheless, the chain-ladder method remains the favorite tool of reserving actuaries. In "**Chain-Ladder Bias: Its Reason and Meaning**," Leigh J. Halliwell explores the bias and what lessons can be learned from the phenomenon of bias—in particular, whether there is a difference between actuarial methods and statistical models.

In "**General Iteration Algorithm for Classification Ratemaking**," Luyang Fu and Cheng-sheng Peter Wu propose a flexible and comprehensive iteration algorithm called "general iteration algorithm" (GIA) to model insurance ratemaking data. They also demonstrate how to apply GIA to solve the broad range of GLM models, mixed additive and multiplicative models, and constraint-optimization problems that pricing actuaries often deal with in their practical work.

Michael G. Wacek presents a framework for stochastically modeling the path of the ultimate loss ratio estimate through time from the inception of exposure to the payment of all claims in "**The Path of the Ultimate Loss Ratio Estimate**." The general framework has application to the quantification of the uncertainty in loss ratio estimates used in reserving and pricing as well as to the evaluation of risk-based capital requirements for solvency and underwriting analysis.

In "**Estimating Predictive Distributions for Loss Reserve Models**," Glenn G. Meyers demonstrates a Bayesian method for estimating the distribution of future loss payments of individual insurers. The main features of this method include a stochastic loss reserving model that is based on the collective risk model, and predicted loss payments derived from a Bayesian methodology that uses the results of large, and presumably stable, insurers as its prior information.

Farrokh Guiahi applies a bivariate lognormal distribution to price a property policy with property damage and business interruption cover subject to an attachment point, separate deductibles, and a combined limit in "**Pricing Multiple Property Cover Based on a Bivariate Lognormal Distribution**." An algorithm is also provided for estimating the average loss cost based on a bivariate lognormal distribution by taking into consideration the loss-sensitive features of the policy.

In "**Using a Bayesian Approach for Claims Reserving**," Mario V. Wüthrich applies the exponential dispersion family with its associate conjugates to the claims reserving problem. This leads to a formula for the claims reserves that is equivalent to applying credibility weights to the chain-ladder reserves and Bornhuetter-Ferguson reserves.

To read these articles, access paper presentations or learn more, visit www.variancejournal.org.

GIRO Convention Covers a Wide Variety of Topics

By Amy Bouska, Member, Europe Regional Committee

Several CAS members attended the 34th Annual GIRO Convention, either as presenters or attendees. Held October 2-5, 2007, in Wales, the meeting included a wide variety of plenary and concurrent sessions covering many topics that would be familiar to any CAS member (continuing education, stochastic reserving, and price monitoring). The convention also included topics that would be unlikely to occur at a CAS meeting (e.g., Irish issues, and the EU equality directive).

GIRO (the General Insurance Research Organization) is the research arm of the General Insurance Board, the casualty practice section of the Institute and Faculty of Actuaries in the U.K. Reflecting the growing importance of property/casualty actuarial practice in the U.K., attendance at the GIRO annual convention has nearly doubled over the past few years, growing from 300 in 1996 to almost 550 this year. In addition to Institute and CAS members, it also draws several general insurance practitioners from Europe. Pat Teufel, the CAS VP-Marketing and Communications and a first-time GIRO attendee, was impressed by the both the number of attendees and the breadth of the topics. "For those who believe that the U.S. is the sole source of quality nonlife actuarial research, attend GIRO," said Ms. Teufel. "This meeting was an eye-opening experience for me. It was exciting to see the progress of the U.K. nonlife actuaries in sponsoring research and developing solutions on current actuarial issues."

"For those who believe that the U.S. is the sole source of quality nonlife actuarial research, attend GIRO."

—Patricia Teufel

GIRO plenary sessions are structured to include short presentations on multiple topics, many of which are then discussed in greater detail in one or more breakout sessions. Mary Frances Miller, a past president of the CAS and an honorary Fellow of the Institute, remarked, "I really like the multiple topic, short general session format. Then if you want more about one of the topics, you can go to the breakout."

The yearly meeting is also an opportunity to form working parties for the coming year. These groups then work on their selected issues for a year (or more) and report on their results at the next meeting. Some of the best-known of these to CAS members are GRIT (the General Insurance Reserving Issues Task Force), its successor ROC (the Reserving Oversight Committee), and GRIP (the pricing "sibling" of GRIT). Chairs of each of these working parties have presented their findings at various CAS meetings, including this year's Annual Meeting in Chicago, when Lis Gibson, the new chair of ROC, led a well-attended panel on "ROC Solid Reserves—Insights from the Reserve Oversight Committee." One of the ROC sub-working parties is looking for volunteers to help test various reserving methods (volunteers should contact Mary Frances!).

"Wikis" were a recurring theme, with several work groups saying they plan to develop wikis to help organize their work and results presentations. Roger Hayne, the CAS VP-Research & Development, was seen taking copious notes during these discussions, so we might have some wikis in our research future, too.

Julian Leigh, the chair of the General Insurance Board, commented that he was delighted that CAS members had made the trip to GIRO and that some Institute members were invited to speak at a recent CAS meeting. "Exchanges like these are important in helping each of our organizations keep up to date on what is happening on the other side of 'the Pond'," said Mr. Leigh.

As part of our Centennial Goal, the CAS leadership is committed to strengthening our ties with other actuarial organizations like the Institute and Faculty, and echoes Julian Leigh's hope for greater sharing with other general insurance actuaries around the world. AR

Cost-Based Rates Versus Market-Based Prices for Insurance

By Cheng-sheng Peter Wu and Jim Guszcza

We recently conducted an internal training session at our company on the fundamentals of data mining and predictive modeling. Most of the audience members were neither property/casualty actuaries nor statisticians. They were from a variety of different units, including IT, health care, and human resources consulting.

To get some audience participation, we posed a hypothetical question to the crowd: suppose you were transported back in time to the period just after World War II, and found yourself working as an insurance company actuary. Back then, the personal auto rating structure was simple and contained very few variables: only age and vehicle use. Knowing what you know about today's insurance rating, what would you do to help your company to win in the marketplace? The audience was unanimous in its response. They replied that they would use modern variables and techniques to price and analyze their book based what they know of modern insurance rating plans.

We followed up with another question: Suppose that with your futuristic rating variables and techniques you discovered a class of risks, half "good" and half "bad," that are all charged approximately $100 in the marketplace. You learn that the good risks have expected losses about one-third the size of the bad risks' expected losses. Thus the good risks could in fact be charged $50 and the bad risks could be charged $150. What would you do with this knowledge?

As we expected, the audience's responses were along the lines of: "Let's get rid of the under-priced risks," "Let's bring the over-priced risks' price down a little bit—say to $90—to improve retention and attract more of these good risks away from our competitors," and so on.

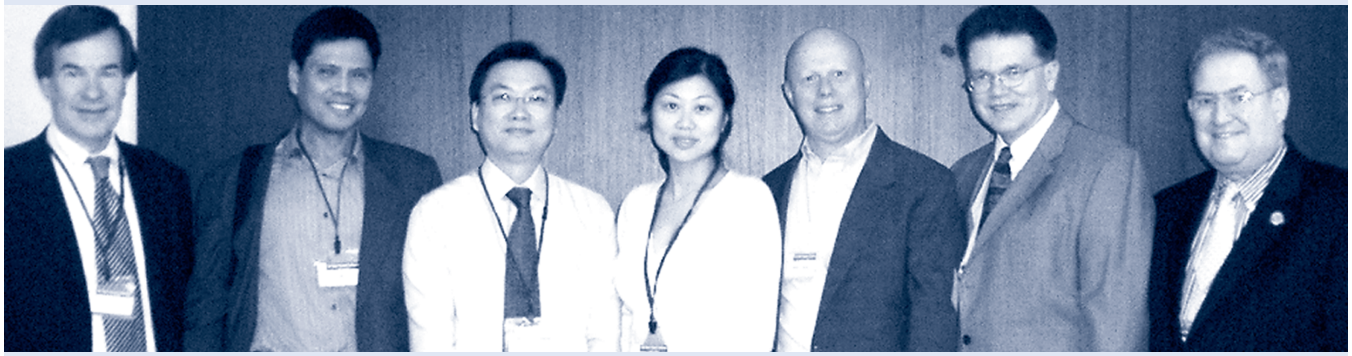
Finally, we concluded our hypothetical thought experiment by quoting the CAS ratemaking principle that states: "A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer." In short, "reasonable" rates are cost-based. Indeed this is Ratemaking Principle 1: "A rate is an estimate of the expected value of future costs." The audience's pricing strategies would seem to violate the principle of "reasonable and not excessive, inadequate or unfairly discriminatory rates."

"One way for insurers to win in a free market is to find pockets of risks that have been inefficiently priced in the marketplace and then use the knowledge of these mispriced risks to increase their profit or gain their market share."

The audience was surprised by this fundamental actuarial principle. The audience's surprise was understandable. After all, cost-based pricing is not the way companies in most industries set prices in a free market. Rather than set prices to reflect the cost of production, they set prices to achieve their goals for making profit and gaining market share. Of course they do this to the extent allowed by laws, regulations, and, at least for certain companies, a sense of social responsibility. Private-sector insurance is no exception.

One way for insurers to win in a free market is to find pockets of risks that have been inefficiently priced in the marketplace and then use the knowledge of these mispriced risks to increase their profit or gain their market share. Private sector businesses typically do not—and should not—charge prices based solely

Actuaries Abroad: CAS Members Attend East Asia Actuarial Conference



A small group of CAS members attended the East Asia Actuarial Conference, which was held in Tokyo on October 9-12, 2007. From left to right are Bruce Moore, Bob Ingco, Raymond Su, Lisa Sun, Bob Conger, Mike Toothman, and Dave Hartman.

on cost. Rather, they charge prices based on cost together with judgments about what the market will bear. Such judgments are informed by knowledge of market inefficiencies, the unique or innovative nature of one's product offerings, understanding of the competitive landscape, and analysis of the varying price sensitivities of one's current and potential customers.

For an extreme example of the distinction between cost of production and price, consider the high-tech sector. Here we have seen again and again that customers will pay a premium for innovative products, regardless of the cost of production. For example, people are willing to stand in line and pay high margins for innovative products like the latest iPod. Indeed, not only do people pay much more than the cost of production for iPods; they will (for now at least) pay more for iPods than they will for competing products with similar functionality. iPod pricing is anything but cost-based.

The most famous example of innovation in the recent history of the P&C industry is the application of credit scores to personal insurance pricing. Credit was first used in this way in the early 1990s. History has taught us that the early believers and adopters of credit scoring gained tremendous benefits from doing so because credit scoring provides information on market inefficiency in pricing insurance. These insurers recognized that credit scores were a fundamentally new dimension of information that improved their knowledge of the true expected costs of writing various types of risks. For this reason, these early adopters viewed their used of credit scores as a "secret weapon" that would help them improve their combined ratio and gain market share. Their strategy was not to apply their insights to better ensure that their rates were neither inadequate nor excessive.

This use of credit scoring was an early manifestation of a trend that has taken root in our industry and is probably here to stay: the use of data mining and "knowledge discovery" techniques to uncover new risk factors and the application of predictive modeling technique to quantify their impacts on optimal rates. So far, nearly every company that has engaged such activities has treated their efforts as highly confidential and proprietary.

Several years ago, merely using predictive models to support pricing gave insurance companies a competitive edge. Today, cutting-edge players apply predictive analytics at the enterprise level. In addition to identifying and quantifying new drivers of cost, insurers apply predictive analytics to a wide range of core operations including underwriting, claims management, target marketing, lifetime value estimation, and market-based pricing. Increasingly market-based pricing decisions are made by taking into account insureds' estimated price sensitivity and expected lifetime value in addition to their expected claim amounts. Here again, the focus is on growing profitably and gaining market share; not on doing an incrementally better job of ensuring that rates are neither inadequate nor excessive.

As we actuaries become ever more deeply involved in wave after wave of innovative analytical work, we will continue to encounter this fundamental conflict between our cost-based ratemaking principle of actuarial science and the profit-seeking principle of business. What is the resolution? Is our principle outmoded? Is our principle valid, but only if considered part of a broader pricing framework? Should it be amended or abolished? What do you think?

Cheng-sheng Peter Wu is a director and Jim Guszcza is a senior manager at Deloitte & Touche LLP in Los Angeles.

BOOKMARK THE ONLINE CALENDAR AT WWW.CASACT.ORG/CALENDAR

CAS PROFESSIONAL EDUCATION CALENDAR

March 04,-05, 2008
Limited Attendance Seminar:
Enterprise Risk Management and Modeling (ERM^2)
General Re Capital Consultants
Stamford, Connecticut, U.S.A.

March 17-18, 2008
Ratemaking Seminar
Royal Sonesta Hotel Boston
Cambridge, Massachusetts, U.S.A.

April 14-16, 2008
ERM Symposium
Chicago Marriott Downtown - Magnificent Mile
Chicago,Illinois, U.S.A.

May 19-20, 2008
Seminar on Reinsurance
Cambridge, Massachusetts, U.S.A.

June 15-18, 2008
CAS Spring Meeting
Le Château Frontenac
Québec City, Québec, Canada

XXXVIIIth ASTIN Colloquium
July 13-16, 2008
Manchester Town Hall
Manchester, England, U.K.
www.actuaries.org/ASTIN2008/

September 18-19, 2008
Casualty Loss Reserve Seminar
Omni Shoreham
Washington,DC, U.S.A.

The Actuarial Review always welcomes letters and story ideas from our readers. Please specify what department you intend for your item—letters to the editor, news, It's a Puzzlement, etc.

SEND YOUR COMMENTS AND SUGGESTIONS TO:
The Actuarial Review
Casualty Actuarial Society
4350 North Fairfax Drive, Suite 250
Arlington, Virginia 22203 USA
Or e-mail us at AR@casact.org

Casualty Actuarial Society
4350 North Fairfax Drive, Suite 250
Arlington, Virginia 22203 USA
Phone: 703-276-3100, Fax: 703-276-3108
www.casact.org

PRESORTED
STANDARD MAIL
U.S. POSTAGE PAID
LANHAM, MD
PERMIT NO. 4410