The Actuarial Review

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Morgan and Delaney Appointed to CAS Board of Directors

—The Casualty Actuarial Society (CAS) is pleased to announce the appointment of Kathryn Morgan, FIA, and Richard T. Delaney to its board of directors. 13

In My Opinion: Sustaining the Quality of the CAS Designation

—Paul Lacko—The first two CAS exams were called Part 1 and Part 2 way back when I sat for them. Part 1 covered calculus, as best I can remember, and Part 2 covered probability and statistics. Ever since I passed those exams, I have wondered why it was even necessary. 34

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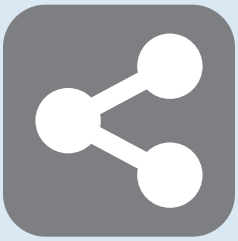
Web Site News



The CAS added two new social media tools to its Web site.

- RSS Feeds: The CAS is now offering Web site visitors the opportunity to sign up for an RSS feed from the CAS Web Site. RSS feeds allow the CAS to distribute Web site content well beyond members using browsers to visit the site. Feeds permit a subscription to regular updates, delivered automatically via a Web portal or news reader such as My Yahoo or iGoogle.
- ShareThis: The CAS added the ShareThis application to its Web Site. ShareThis allows CAS Web Site visitors to share content across blogs, social networks, e-mail, instant messaging, and text messaging without leaving the CAS Web Site. Visitors appreciate how easy it is to use. This type of viral marketing is valuable, as the CAS benefits from the increased exposure for its Web content. AR

Sponsors Support the 2009 CLRS

The CAS appreciates the support provided by the sponsors of the 2009 Casualty Loss Reserve Seminar (CLRS):

- Padfolio Sponsor—EMB
- Lanyard Sponsor—Milliman
- Pen Sponsor—Pauline Reimer/ Pryor Associates Executive Search

The 2010 CLRS is scheduled for September 20-21 at Disney's Contemporary Resort in Lake Buena Vista, Florida. Contact Mike Boa at the CAS Office (mboa@casact.org or 703-562-1724) for details on sponsorship and exhibitor opportunities for the 2010 event. AR

New Approaches in Admissions Vital to Reaching the Centennial Goal

As I reflect on the recent CAS Board of Directors meeting held in late September, I see many weighty, important issues facing our Society, and a board ready to face these challenges head-on.

Some of the issues the board continues to grapple with include development of leaders, discipline of members, and technical excellence of members. As always, there were important admissions-related items on the agenda, and the board approved two initiatives that move the CAS closer to achieving its Centennial Goal of being recognized globally as a leading resource in educating casualty actuaries.

First, the board approved a policy to accept professionalism courses offered by actuarial organizations outside the CAS, subject to CAS review and approval. In approving this new policy, the board also directed the development of an Internet-based module that would address the CAS Code of Professional Conduct for those who did not take the CAS Professionalism Course.

Second, the board furthered the CAS's policy for accepting nation-specific exams. As a result, the CAS will begin to accept the nation-specific exam of the Actuarial Institute of Chinese Taipei, to be recognized as Exam 7T, effective after January 1, 2010, pending a final review and approval of the exam by the CAS.

Another admissions initiative that the board discussed, but did not take action on, is known as Future Education Methods or FEM. Originally proposed by the Canadian Institute of Actuaries, the initiative would institute an accreditation process for qualifying university actuarial programs in the United States and Canada, and provide examination exemptions to students who receive high marks in certain courses at these schools.

As planned, the board took no action on FEM because the idea is currently in an exploration phase within the CAS. In fact, the board agreed during the September meeting that it would not be bound by any externally imposed time limits in reaching a decision about FEM and that it would carefully review all of the implications with respect to moving forward or declining to move forward with FEM.

The board affirmed that it is committed to seriously considering the views of the members on this proposal and I understand that more than 1,000 letters of feedback have been received thus far. The board will be reviewing these comments and discussing the views of the members during our next board meeting in November.

Our pursuit and consideration of member feedback will not stop there. During our September meeting, the board agreed that the CAS should continue to seek feedback on the FEM proposal. We expect to conduct a survey on FEM with the CAS Member Advisory Panel and perhaps the entire membership, after details on the FEM proposal are prepared by the Joint Accreditation Committee and reviewed by the FEM Steering Committee in early 2010.

Weigh the advantages as well as the disadvantages and consider how changes to the admissions process will position the CAS for the future.

With the commitment of the board to take your feedback into account as it debates the FEM proposal, I have a request for CAS members. Since the FEM proposal was announced, I've heard emotional arguments from members against the concept that go something like this: "It's not fair to change the admissions requirements and process—if I had to pass actuarial exams to achieve my credentials, so should everyone else."

This argument is familiar to me because I had the same instinctive reaction myself, when I first thought about the possibility of utilizing university training in the actuarial credentialing process. One thing that I've learned as president of the CAS is that instinctive reactions can short-change other considerations that may have unforeseen implications. When I consider an issue more methodically, I sometimes reach better and different conclusions.

So my request of CAS members is that each of you seeks out information about the FEM proposal and learns details before reaching a firm conclusion. Weigh the advantages as well as the disadvantages and consider how changes to the admissions process will position the CAS for the future. You will then be well-informed to provide valuable feedback to the board. AR

A Song in His Heart

Dear Editor:

To celebrate the lighter side of the heated debate over the Future Educational Methods (FEM) proposal I have improvised the following song lyrics and would be delighted if you would like to publish them.

—Jon Evans, FCAS, MAAA

The FEM Song

(Lyrics improvised by Jon Evans, sung to the music of "Wonderful World" by Sam Cooke)

Don't know much about contingencies
Don't know much credibility
Don't know much about an insurance book
Don't know much about the statistics I took
But I can take a class from you
And I know that if you pass me too
How easy Fellowship would be
Don't know much about probability
Don't know much economy
Don't know much about reinsurance
Don't know what an annuity is for
But I do want an exemption or two
And if this waiver could come from you
How easy Fellowship would be
Now I don't claim to be an "A" student
But I'm trying to be
So maybe by being an "A" student Hardy
I can win your exemption for me

Glenn Meyers, FCAS, member of the CAS Future Education Methods Steering Committee responds:

While Mr. Evans does supply us with catchy new lyrics to an old classic, the song does not reflect the reality of majoring in actuarial science or the expected rigor of the proposed FEM process. Back when I taught actuarial science, it was regarded as one of the hardest majors on campus. Students do learn the material, as evidenced by the high pass rates of students in the exams related to the courses under consideration in the FEM proposal (see "An Analysis of Exams 3 and 4," Actuarial Review, *November 2001). In addition, it should be noted that those students who continue their education to obtain an actuarial designation will have passed several challenging exams along the way. While the FEM proposal may reduce the anxiety associated with the current exam process, it will not reduce, and could very well increase, the knowledge one obtains by completing the process. I applaud the open dialogue related to the FEM proposal but discourage the perpetuation of myths and hope that when the detailed proposal is released in 2010, we will receive constructive feedback that does not unfairly disparage those who have completed a rigorous course of study in actuarial science.*

Flatter is Better

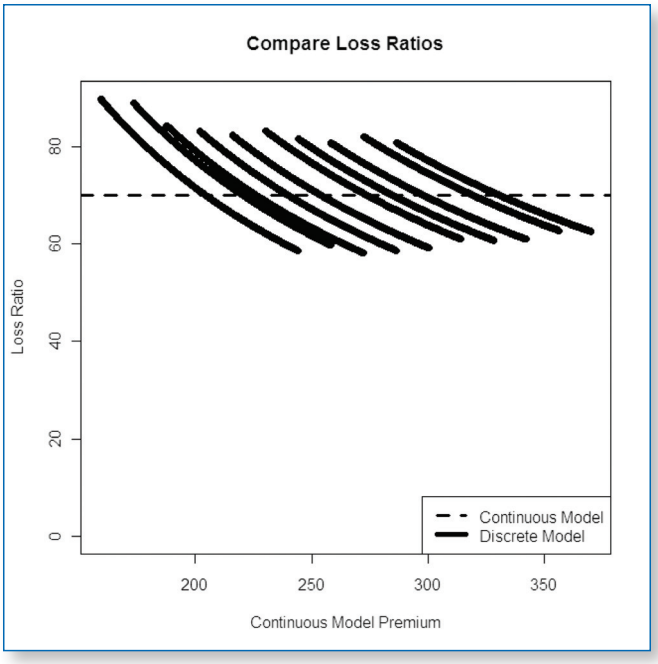
Dear Editor:

Regarding the "Brainstorms" column by Glenn Meyers and David Cummings (*Actuarial Review*, August 2009), I think one piece of information is missing. In the example, the graph of loss ratios with the continuous model will be a downward line, just opposite to the graph of loss ratios with the discrete model. The competitor using the continuous model could take profitable risks (20% of the business in this case) from you, and you would be able to take 20% of your competitor's business (less profitable for you, because your prices are lower.) So the key is the profitability of the business you lose relative to the profitability of the business your competitor loses. In other words, the one with the flatter loss ratio curve will win.

—Jie Dai

Brainstorms Author Glenn Meyers responds:

Mr. Dai suggests a good way to visualize the point of the article. Taking his suggestion I plotted the loss ratios we expect the competitors to experience. This competitor using the continuous model would gain the most profitable business—the right side of each segment and expect a flat loss ratio. The competitor using the discrete model would retain the least profitable risks—and expect the loss ratios on the left side of each segment. AR



Just a Reminder for 2011…

The CAS will implement a new education structure in 2011. Background information and details that are available in the Admissions/Exams section of the CAS Web Site (www.casact.org) include the following:

- The preliminary exams (1-4) and Validation by Educational Experience requirements will not have significant changes.
- Some material will be moved to two self-paced Internet-based modules. The remaining upper-level material will be restructured in 5 exams.
- ACAS requirements will be new Exams 1-6, the three VEE requirements, two modules, and the Course on Professionalism. There will be three Fellowship exams.
- Material on advanced reserving topics will be added to the syllabus but financial economics material that was previously moved from Exam 8 to Exams 2-3 will no longer be included in the upper-level syllabus.
- Basic ratemaking and basic reserving material will be grouped onto one exam to provide a better educational experience given the natural linkage of this material. AR

Looking *Forward* to the New CAS Education Structure in 2011

As announced in March 2008, the CAS will implement a new education structure in 2011. Background information and details are available in the Admissions/Exams section of the CAS Web Site (www.casact.org). In July 2009, the following transition rules were declared to be final:

Current Exam	Credit in 2011 Education Structure
Exam 5	Half Exam on Basic Ratemaking* + Module 1
Exam 6	Half Exam on Basic Reserving* + Exam on Advanced Reserving, Reinsurance, and ERM
Exam 7	Exam on Regulation and Financial Reporting + Module 2
Exam 8	Exam on Investments and Rate of Return
Exam 9	Exam on Advanced Ratemaking

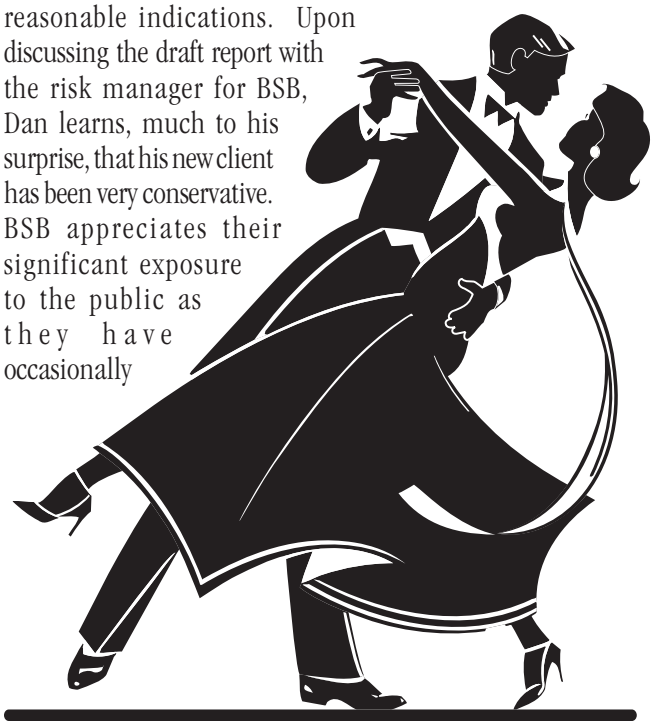
* To receive credit for the new exam on Basic Ratemaking and Reserving, the candidate must have credit for both old Exams 5 and 6. At the time of transition, if a candidate has credit for only one of the required exams (either Exam 5 or Exam 6), the candidate will be allowed to take just the part of the exam for which he or she is missing credit (i.e., either the basic ratemaking section or the basic reserving section of the new exam) in order to obtain credit for the new exam. It is anticipated that this option will be available for at least two sittings after the official conversion to the new education structure.

New Client Tango

Editor's Note: This article is part of a series written by members of the CAS Committee on Professionalism Education (COPE). Its intent is to stimulate discussion among CAS members. Therefore, positions are sometimes stated in such a way as to provoke reactions and thoughtful responses on the part of the readers. Responses are welcomed. The opinions expressed by readers and authors are for discussion purposes only and should not be used to prejudge the disposition of any actual case or modify published professional standards as they may apply in real-life situations.

Dan Singact from Slide Step Consultants is approached by Big Struggling Business (BSB) Entity to provide quarterly reserve reports. BSB has recently self-insured their primary layer using a large deductible program of $750k per workers compensation claim and $2.5 million per general liability claim. Historical (unlimited) data is available to Dan from their previous program and from the current program. However, BSB has not informed Dan of the amount currently carried for total reserves. Moreover, Dan believes that his report will be the first independent actuarial report for BSB since they self-insured almost three years ago.

Concerned that the first independent actuarial reserve estimate could seem shockingly high, Dan issues a draft report that tends towards the low end of a range of reasonable indications. Upon discussing the draft report with the risk manager for BSB, Dan learns, much to his surprise, that his new client has been very conservative. BSB appreciates their significant exposure to the public as they have occasionally experienced extremely serious claims, including death and dismemberment. Dan issues a second draft in which total reserves are increased by about 10% or ten million dollars. He documents the fact that he has taken a more conservative approach, and a final report is issued.



Dan issues subsequent quarterly reports to BSB over the next year. His general approach is to follow the conservative lead of his client's carried reserves, fine-tuning for run-off in more mature years after adding each new quarter of exposure. After the first actuarial report, the language concerning the conservative approach is dropped and it is "business as usual" for Dan.

Over time, BSB becomes more confident in their new program and more familiar with Dan's reports. The request is made for Dan to run his reports using only straight averages for link ratios and to avoid all judgmental selections. Dan sets out to please his client and runs his reports with blind averages. The result is a decrease in total estimated reserves of about 5%, in the neighborhood of five million dollars.

Dan becomes concerned about the direction his client is headed. Financial regulators and analysts may raise questions and issues if there is a sizeable takedown in reserves at one time. Ironically, however, Dan feels that these "blind" average estimates are not bad and are probably more accurate than the conservative approach he has been following over the past year.

Deliberating on what to do, Dan reviews ASOP 43, particularly the following paragraph from section 3.6.2:

> When the principal is interested in the value of an unpaid claim estimate under a particular set of assumptions different from the actuary's assumptions, the actuary may provide the principal with the results based on such assumptions, subject to appropriate disclosure.

Dan could provide an estimate of total unpaid claim reserves, documenting that he has followed a request by his client to use assumptions that differ from his own. However, this disclosure in his reports every quarter going forward could lead to other types of questions and issues being raised. To use this approach consistently for the future, Dan will have to buy into these assumptions himself.

Dan has been following the client's lead concerning the conservative approach inherent in their carried reserves. Should he now follow the new direction the client is heading? What are Dan's options?

Yes

Dan has always believed that BSB's reserves are conservative as documented in his first report. Perhaps it was justified to listen to BSB's desire to maintain conservative reserves initially, given that their self-insured program was fairly new and they were interested in ensuring adequate funding. Now that they are further along with their program, he can justify the change to assumptions that provide the "best estimate" under GAAP accounting. Dan probably will not use "blind" averages everywhere, but he can generally follow the client's new lead at this time. Again referring to ASOP 43 for guidance, he relies on section 4.2 (b):

In the case when the unpaid claim estimate is an update of a previous estimate, the actuary should disclose changes in assumptions, procedures, methods or models that the actuary believes to have a material impact on the unpaid claim estimate and the reasons for such changes to the extent known by the actuary.

No

Dan should not have dropped his documentation of the conservative approach that he and the client agreed to in his initial report. In accordance with ASOP 43, section 4.1 (a):

> The actuary should disclose …in an appropriate actuarial communication…the intended purpose(s) or use(s) of the unpaid claim estimate, including adjustments that the actuary considered appropriate in order to produce a single work product for multiple purposes or uses, if any….

The conservative approach he followed could be considered an "adjustment" to his own more typical assumptions that should have been disclosed in each quarterly report. Because he did not provide such a disclosure (after the first report), Dan appeared to agree and buy into his client's approach, based on insufficient historical experience or some other rationale. Significantly more history is not available just one year later. In addition, the nature of the exposure is unchanged. Therefore, Dan should be prepared to defend his current set of conservative assumptions and to steer his client away from the estimates produced by a "blind" average approach. After all, Dan is the expert and he should be providing significant guidance to his client on the appropriate level of reserves to carry. Clearly, he should not follow his client's new direction until more history becomes available. More importantly, he should convince himself of the necessity for changing assumptions. AR

25 Years Ago in the *Actuarial Review*

Will PCs Ever Be Useful?

By Walter Wright

In 1982 most of us probably shared the sentiments of C.K. "Stan" Khury, as expressed below in a letter to the editor. How wrong we were!

Count me in your corner (Editorial, August 1982). I also have been wondering just what possible worthwhile use a PC could have for us earthlings in our homes. Almost every application I read about or can think of is essentially contrived. I am reminded of the current adage: The PC is an invention looking for a use. AR

The Fatal Error of Solvency II

Preface by Mark Shapland

Several recent articles in *The Actuarial Review* have dealt with issues related to Fair Value accounting and Solvency II, but they all seem to start with the premise (although perhaps unintentionally) that incorporating risk management practices into accounting standards is a prerequisite to better risk management. The following excerpt of an article from *The Actuary* in the U.K. challenges that premise. While each of us need not agree with the arguments presented, if, as a profession, we are going to debate the merits of new accounting standards it is only appropriate to read as many views as possible.

The Fatal Error of Solvency II

By Jesús Huerta de Soto

The following excerpt is taken from an article of the same name published in The Actuary *in December 2008. This excerpt is reprinted with permission of the author.*

The insurance sector is currently immersed in a process of legislative reform intended to "modernize" and "adjust" the solvency requirements of insurance companies through the implementation of the most "advanced" tools of finance theory and risk analysis. Up to this point, few people have dared to even question the scientific validity of the foundations upon which the new "Solvency II" paradigm rests. On the contrary, most have received it with the naïve jubilation typical of those who feel a reverential respect toward apparently complex and sophisticated models, even if only because they are afraid of revealing their ignorance if they criticize them in any way. That minority of professionals—the most educated in terms of theory and practice—who at least sense the grave inadequacies in much of the proposed revision give in easily to defeatism. They accept as inevitable the coming avalanche and settle for criticizing a few details or inconsistencies without daring—at least publicly—to make amendments to the whole of the new system (though among the Spanish, Maestro, 2007, is notably courageous). Curiously, this situation parallels that which has arisen in the banking sector with respect to the solvency standards in "Basel II" and also with respect to the new International Accounting Standards, IAS, which are much broader in scope, and hence much more dangerous to the market economy, since they affect business operations in all economic sectors (Huerta de Soto 2003). Nevertheless, we are seeing the emergence of an extensive scientific literature which increasingly questions the scientific basis of this entire trend and asks whether the new rules might not produce results which are exactly the opposite of those desired in terms of transparency, competitiveness, improved operations, and solvency (See, among others, Zicchino 2006 and Kaplanski and Levy 2007).

Two or three decades usually pass between the time a group of scientists, ensconced in their university ivory towers, develop their theoretical lucubrations and models and the time a few of these end up seeping into daily economic operations (normally due to the efforts of powerful interest groups—such as auditors, investment banks, stock market speculators, etc.). When models become fashions and an attempt is made to implement them using the force of law, frequently their lack of a scientific basis has already been demonstrated (though the disconcerted majority of citizens remain unaware of the fact). This has been precisely the case with the theoretical foundations upon which Solvency II, Basel II, and the IAS rest, to a large extent jointly.

The entire Solvency II paradigm blatantly disregards essential economic principles. To begin with, it stipulates that an insurance company must have at least a 99.5% "objective" probability of not going bankrupt, and based on this goal, the solvency margin which would supposedly insure its achievement is calculated.

However, what does it mean for an insurance company to have a 0.5% chance of going bankrupt? That just one company out of every 200 fails each year? That any one firm in 200 years of existence is only in danger in one of those years? What class of homogenous phenomena would permit us to make sense of that "probability" figure? Indeed there is none. Every insurance firm is a historically unrepeatable unique event which differs from

the rest in terms of its entrepreneurial plan, the vision of its managers, its culture, its products, its adaptability, etc., etc. Furthermore, any one insurance company varies from year to year, and thus it cannot be equated with itself over time either, nor is it possible to consider the historical sequence of its years in existence as a class of homogenous elements. We conclude that the figure "0.5% probability of ruin" is a simple metaphor which is bereft of objective and scientific meaning, conveys only the idea that the possibility of ruin "is very slight," and therefore amounts to the mere manifestation of a subjective desire, the meaning of which varies substantially depending on the observer.

Moreover, if the goal lacks scientific meaning, so does the new margin calculation in Solvency II, since it collides head-on with the permanent nature of the uncertainty that surrounds every entrepreneurial project. Specifically, the different aspects of the inaccurately termed "risks" analyzed in Solvency II are not insurable (except perhaps insurance risks alone). Market risk, credit risk, interest risk, operational risk, etc. (which are not really risks, but uncertainties) belong to the sphere of human action, i.e. that of unique cases of entrepreneurial creativity which, by their very nature, are not insurable. Furthermore, it is of no use to extrapolate to a permanently uncertain future of inhomogeneous, unique entrepreneurial events the probability distributions and scenarios which can be obtained or imagined based on past data. (Let us remember the fiasco of the hedge fund Long-Term Capital Management, when faced with a scenario no one had yet been able to even imagine.)

In the end, whether or not an insurance company goes bankrupt depends on concrete human actions which may or may not be performed, and which are not insurable in economic terms (via a supposedly "scientific" solvency margin), since the existence of the supposed "insurance" would influence the entrepreneurial actions themselves and thus increase the possibility of an "accident" (the failure of the insurance company). In other words, while the existence of a life insurance policy does not increase the probability of the death of the insured, the legal establishment of a hypothetical bankruptcy insurance policy (via the Solvency II margin) actually does affect the conscious or subconscious behavior of the insured entrepreneurs, even if only because it gives them the false belief that Solvency II provides them with an automatic safety net to protect them from their entrepreneurial errors. Consequently, the very existence of the supposed "insurance" (the Solvency II margin) will tend to foster biased entrepreneurial behaviors that in the long run will increase volatility and hence hinder responsible entrepreneurial operations and cause more headaches for the regulatory agency and more confusion for the insured.

It is remarkable that over the last 200 years, insurance companies, without any of the modern tools of neoclassical finance theory, VAR analysis, the study of scenarios with different probability distributions, nor in short, any of the theoretical framework on which Solvency II is based, have overwhelmingly complied with their obligations and survived wars, economic and social crises, and the most varied external shocks, forces other financial institutions, such as banks (by definition insolvent in the absence of a lender of last resort) have not been able to withstand with the same level of solvency. This has been so because the insurance sector has learned and evolved a number of customs (for example, historical cost accounting, the passive, highly conservative management of preferably fixed-income investments, the use in life insurance of technical interest rates with no inflation component, the introduction of contractual clauses aimed at eliminating moral hazard, etc.) which have permitted it to successfully weather the continual uncertainties (not risks) stemming from its entrepreneurial operations.

Nonetheless, today, paradoxically, an attempt is being made to eliminate one by one these traditional principles of the insurance sector (market or "fair" value accounting, the elimination of the equalization reserve, cash flow accounting and the rest of the IAS, "active" investment, investment in alternative instruments, etc.). The traditional principles are to be replaced with a "postmodern" ad hoc management which is supposedly more "scientific" but in which anything goes as long as the Solvency II margins, expected to "guarantee" a 0.5% probability of insurance-firm failure, are maintained. However, if the new postulates end up prevailing in practice (beyond the simple compliance with an interventionist supervisory requirement that nevertheless does not affect the way in which, in accordance with long-established custom, things were already being done), clearly the effects will be quite the opposite of those allegedly sought: less general solvency in the insurance sector, to the detriment of the safety which has characterized it up to now and which has done so much good to the insured; and a profit—at least in the short run—for a legion of "authorities," experts, analysts, auditors, etc., some of whom are so arrogant in defending their false science as they are ignorant of the fact that in the long run they are nothing but sorcerer's apprentices who are playing with a fire that may endanger the very foundations of the market economy in general, and of the insurance institution in particular.

Jesús Huerta de Soto is a professor of political economy at the Universidad Rey Juan Carlos in Madrid. He may be contacted at huertadesoto@dimasoft.es. A related article posted on February 4, 2009, titled "Financial Crisis: The Failure of Accounting Reform" can be found at www.mises.org.

ERM Symposium Returns to the Windy City in 2010

Nearly 500 senior executives, directors, and risk management experts gathered at the 2009 Enterprise Risk Management (ERM) Symposium in Chicago to present and discuss the latest thinking on ERM practices. The 2010 ERM Symposium, sponsored by the Casualty Actuarial Society (CAS), the Society of Actuaries (SOA), the Canadian Institute of Actuaries (CIA), and the Professional Risk Manager's International Association (PRMIA), returns to Chicago on April 12-14.

The ERM Symposium will provide an ideal learning opportunity for those interested in emerging risk management techniques and trends, both within the insurance industry and beyond.

The 2010 ERM will include:

- Top risk management experts offering their perspectives on key risk issues
- Pre-Symposium seminars on ERM topics
- Networking opportunities to renew and expand your list of ERM contacts
- Exhibitors demonstrating their ERM services and knowledge
- Call for papers program showcasing new research

Companies who wish to showcase their ERM knowledge and services to key decision makers from insurance and other industries can do so by being a sponsor or exhibitor.

Visit the ERM Symposium Web Site (www.ERMSymposium.org) to learn more about this opportunity to broaden your skills and keep up with the latest ERM developments. AR

Save the Date for the RPM Seminar

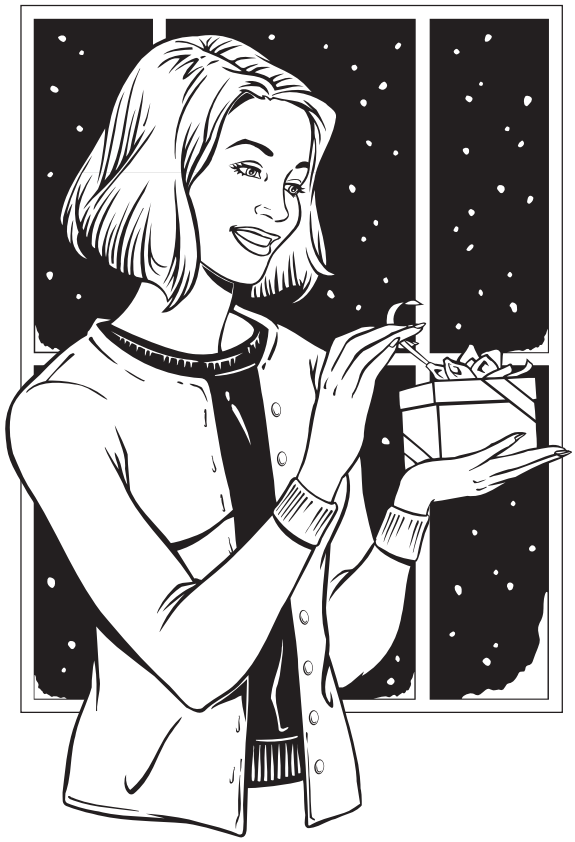
The 2010 Ratemaking and Product Management (RPM) Seminar will be held March 15-17 at the Fairmont Chicago, Millennium Park in Chicago, IL. The RPM Seminar offers a wide range of continuing education opportunities for actuaries, product managers, underwriters, and other insurance professionals. Sessions are designed for both novice and experienced attendees making this seminar beneficial for professionals of all skill levels.

Sign up early for a continuing education opportunity offering over 50 different concurrent sessions within tracks including personal lines, commercial lines, predictive modeling, product management, data management, and underwriting to name a few. A full day of optional workshops before the regular program will give registrants an opportunity to receive a more focused, creative, and interactive way to learn about this topic. Details on the 2010 RPM Seminar are available on the CAS Web Site. Be sure to register early for this new hit Seminar! AR

MICHAEL ERSEVIM

2009 Actuary's Holiday Gift-Giving Guide

Whichever holidays you celebrate, here are a few timely suggestions of thoughtful gifts for those special people in your life.



For the wife:

Nothing says "I Love You" like the complete leather-bound editions of The CAS *Proceedings*, Vols. I-XCI, signed by the editors with a foreword by Lewis Carroll. Limited numbers, so order early.

For the husband:

Let him know he's special with a handy tip calculator. Perfect for the man who can pass all his exams, but can't figure out 20% of a bill without using a chalkboard and integrals.

For the boss:

There's no better way to show respect to those in authority than to always do your best and to bow and scrape with humility. A few bottles of Jack Daniels may also help to get the New Year off on the right foot.

For your actuarial students:

A gift-wrapped package of your old study notes and flash-cards (in order to give those struggling underlings a fighting chance at passing) is probably the nicest thing you can do for them.

For the kids (boys):

Sure, they say they just want to spend more time with you. But won't their faces light-up with delight when you present them with the classy heirloom desk clock that you picked out of the corporate catalog for your 20th anniversary of employment? It doesn't fit on your cluttered desk anyway.

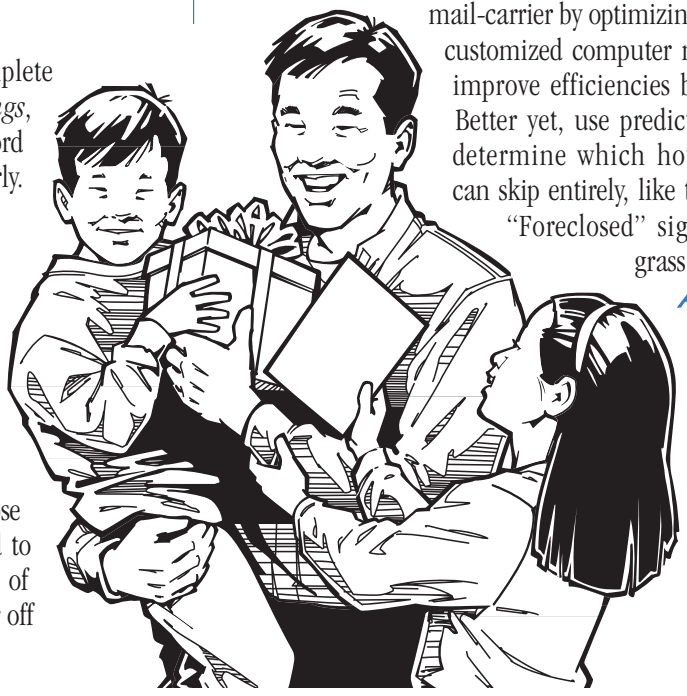
For the kids (girls):

What little girl wouldn't be thrilled with a slightly used dry-erase whiteboard? Oh, the anticipation! You can almost smell the acrid markers and feel the soft fuzz of the erasers on your cheek just thinking about it. Many times, these can be found discarded in store rooms or conference rooms, just waiting for a new home.

For the letter carrier:

Putting a $20 bill in the mail-box is so passé and trite. However, you can really score points with your mail-carrier by optimizing his route with a customized computer model that could improve efficiencies by 10% or more! Better yet, use predictive modeling to determine which houses the carrier can skip entirely, like the ones with the "Foreclosed" signs and very tall grass in the front lawn.

AR



Results of 2009 CAS Election

Hayne to Become CAS President; Blanchard Voted President-Elect

ARLINGTON, Va.—Roger Hayne, who was voted in as president-elect in 2008, will become CAS president at the close of the 2009 CAS Annual Meeting. Ralph Blanchard has been elected CAS president-elect.

Roger Hayne

Balloting for the 2009 CAS election closed on August 28, 2009, and the CAS Tellers have verified the election results. CAS Fellows elected Beth Fitzgerald, Richard Goldfarb, Arlie Proctor, and Kenneth Quintilian to the CAS Board of Directors. Immediate Past President John J. Kollar will chair the CAS Board. The following members were elected or re-elected by the board to serve as vice presidents:

Ralph S. Blanchard

- Leslie R. Marlo, Vice President-Administration
- David L. Menning, Vice President-Admissions
- Kevin G. Dickson, Vice President-ERM
- Kris D. DeFrain, Vice President-International
- Nancy A. Braithwaite, Vice President-Marketing and Communications
- Chester John Szczepanski, Vice President-Professional Education
- Louise A. Francis, Vice President-Research and Development

These Fellows will assume their positions at the close of the 2009 Annual Meeting in Boston.

A total of 1,208 Fellows voted in this year's election, or 35% of the Fellows. This compares to 1,219 Fellows or 37% for last year.

According to the election procedures approved by the Board, all vote counts are released to the membership. These follow:

President-Elect	
Ralph Blanchard	1,013
Director	
Richard Goldfarb	650
Beth Fitzgerald	625
Arlie Proctor	596
Kenneth Quintilian	553
Robert Anker	497
James Christie	432
Cara Blank	413
Clive Keatinge	345

5,000th Member Highlights CAS's International Growth

The CAS reached the 5,000 member milestone with the addition of 266 new members approved by the CAS Executive Council on August 20, 2009. The CAS membership now consists of 3,473 Fellows, 1,641 Associates, and 28 Affiliate members, for a total 5,142 active members.

Over the past several years, CAS has achieved significant international growth. The CAS recognized this achievement through the addition of its 5,000th member, Guillaume Lamy from Canada. "It is no coincidence, given CAS's international goals, that the 5,000th member is from outside the U.S. CAS has worked hard to ensure that its membership reflects a growing international community of actuaries," said CAS President John J. Kollar.

Started in 1914, the CAS was originally named the Casualty Actuarial and Statistical Society of America. The charter class totaled 97 Fellows—the only classification for members at the time. In 1921, the organization adopted its current name, the

5,000th Member, page 13

Morgan and Delaney Appointed to CAS Board of Directors

ARLINGTON, VA—The Casualty Actuarial Society (CAS) is pleased to announce the appointment of Kathryn Morgan, FIA, and Richard T. Delaney to its board of directors. Ms. Morgan will serve a one-year term beginning in November 2009. Mr. Delaney will serve from March 2010 to November 2010.

Kathryn Morgan's perspective on Solvency II and other international issues important to the actuarial profession made her a strong candidate for the appointment. Ms. Morgan works for the U.K. Financial Services Authority in the Policy Section with responsibilities for Solvency II development and implementation. She is deputy chair of the Institute of Actuaries' General Insurance Practice Executive Committee (previously called the General Insurance Board) and chair of the GIRO Solvency II Working Party. Previously, Ms. Morgan was chief actuary of CIS Insurance.

Richard T. Delaney has had a wide range of consulting experience on property and casualty insurance and reinsurance matters as well as direct insurance experience and responsibilities. Prior to his retirement Mr. Delaney was president and chief operating officer of Am-Re Consultants, Inc. and vice chairman of Am-Re Global Services. Before joining Am-Re Consultants, Inc., Mr. Delaney was with Tillinghast/Towers Perrin for over twenty years. At Tillinghast/Towers Perrin, he led the Insurance Management and Operations Consulting Practice. Before joining Towers Perrin, he was responsible for commercial lines product development for the Glens Falls Group.

Richard T. Delaney

Kathryn Morgan

The CAS Board is authorized to appoint three Directors. Ms. Morgan and Mr. Delaney join Dr. Morton Lane, president of Lane Financial LLC, as non-CAS members serving on the CAS Board of Directors. Mr. Delaney will fill the seat vacated by Mark Vonnahme, who will complete his three-year appointment to the CAS Board at the conclusion of the CAS Annual Meeting this November. Ms. Morgan will fill a seat that became vacant when the Board decided not to reappoint the VP-Casualty of the American Academy of Actuaries to the CAS Board, consistent with a decision to coordinate with the Academy through a newly established liaison position.

5,000th Member, From page 12

Casualty Actuarial Society, and by 1965 the CAS had more than 400 members.

It was the late 1980s and '90s that saw the actuarial profession grow quickly in membership, helped along by recognition of the profession in the *Jobs Rated Almanac.* In 1985, the CAS reached 1,000 members, and in 1988, "Actuary" was first recognized in the *Jobs Rated Almanac* as the best job in America. "Actuary" has been rated among the top five jobs in every edition since.

Employment growth in the insurance industry as well as demand for the actuarial skill set in other industries helped propel the CAS to reach 2,000 members in 1992, 3,000 members in 1998, and 4,000 members in 2005.

The Casualty Actuarial Society is an organization dedicated to the advancement of the body of knowledge of actuarial science applied to property, casualty, and similar risk exposures. The primary goal of the Casualty Actuarial Society is to provide education and research to help its members become leading experts in the evaluation of hazard risk and the integration of hazard risk with strategic, financial, and operational risk.

IN CELEBRATION OF VOLUNTEERS: THE CAS 2009 VOLUNTEER HONOR ROLL

WE ARE AN ASSOCIATION OF PEOPLE, PROFESSIONALS, AND FRIENDS.

Since the founding of the CAS in 1914 volunteers have been the main life force sustaining the society through its various dimensions of growth—in the examination process and in the variety of continuing education activities as well as in supporting the sheer growth in membership. As a result members of the CAS through their numerous volunteer activities essentially direct all phases of CAS operations.

In one particular year, 902 CAS members volunteered to fill 1,359 positions. An effort of this scale, which is quite typical, generates a continuous need for volunteers. Each year about a third of these positions become available through normal rotation. These positions include the entire range of CAS activities: the examination committees, research and development activities, liaison representatives, and various program committees and speakers, who serve as faculty for these programs. We'd also like to thank AAA volunteers, meeting and seminar speakers, and Regional Affiliate program participants not listed here. We recognize that none of these activities can take place without the active participation of the many CAS volunteers and for this we thank you.

Christina Dione Abbott
Jennifer Lynn Abel
Yazeed F. Abu-Sa'a
Shawna S. Ackerman
Jeffrey H. Adams
Karen H. Adams
Jeffrey R. Adcock
Barbara J. Addie
Avraham Adler
Martin Adler
Amit Agarwal
Hussain Ahmad
Marcus R. Aikin
Justin L. Albert
Robert Aldorisio
Terry J. Alfuth
Mark S. Allaben
Craig A. Allen
Ethan D. Allen
Sheen X. Allen
Fernando Alberto Alvarado
Brian Alvers
Athula Alwis
Timothy Paul Aman
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Kevin L. Anderson
Mark B. Anderson
Paul D. Anderson
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Jonathan L. Ankney
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Joel E. Atkins
David Steen Atkinson
Richard V. Atkinson
Yanfei Z. Atwell
Timothy Atwill
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Farid Aziz Ibrahim
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Barry Luke Bablin
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Silvia Bach
Kristi Spencer Badgerow
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Robert Sidney Ballmer
Stevan S. Baloski
Phillip W. Banet
D. Lee Barclay
Emmanuel Theodore Bardis
Katharine Barnes
Tiffany Jean Baron
Rose D. Barrett
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Irene K. Bass
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Esther Becker
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Aaron J. Beharelle
Saeeda Behbahany
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Michael J. Belfatti
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Abbe Sohne Bensimon
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Regina M. Berens
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Suzanne E. Black

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Paul Braithwaite
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Louis Gariepy
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Joseph P. Greenwood
Daniel E. Greer
Russell H. Greig
Neil A. Greiner
Francis X. Gribbon
Charles R. Grilliot
Jeffrey Robert Grimmer
Erin Ashley Groark
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Carleton R. Grose
Christopher Gerald Gross
Jason L. Grove
Dawson T. Grubbs
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Denis G. Guenthner
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James C. Guszcza
Sam Gutterman
Elizabeth Susan Guven
Serhat Guven
Jonathan M. Guy
Christina Link Gwilliam
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William Joseph Hackman
Nasser Hadidi
Larry A. Haefner
Greg M. Haft
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Jeannette Marie Haines
James A. Hall
Leigh Joseph Halliwell
Scott T. Hallworth
Aaron M. Halpert
Sandra K. Halpin
David Scott Hamilton
Bobby Earl Hancock
Trevor C. Handley
David Lee Handschke
George M. Hansen
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Robin A. Harbage
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Robert L. Harnatkiewicz
Michelle Lynne Harnick
Christopher L. Harris
Danielle Richards Harrison
Guo Harrison
Thomas Hartl
David G. Hartman
Gary M. Harvey
Diane K. Hausserman
Robin A. Haworth
Gordon K. Hay
Jeffery Tim Hay
Jonathan B. Hayes
Stuart J. Hayes
Roger M. Hayne
Gregory L. Hayward
Qing He
James Richard Healey
Philip E. Heckman
Timothy T. Hein
Scott E. Henck
David E. Heppen
Joseph A. Herbers
Steven C. Herman
Brady L. Hermans
Kelly J. Hernandez
John Herzfeld
Kathryn Enochs Herzog
Thomas Gerald Hess
Todd J. Hess
Thomas E. Hettinger
Brandon L. Heutmaker
Daniel D. Heyer
Jay T. Hieb
Joseph S. Highbarger
Anthony D. Hill
John V. Hinton
Patricia A. Hladun
Carole K.L. Ho
Ryan Yin-kei Ho
Dennis E. Hoffmann
Mark R. Hoffmann
Kimberly Ann Holmes
Rebecca Heather Holnagel
Mark J. Homan
David L. Homer
Gary Hoo
Allen J. Hope
Kenneth J. Hoppe
Nancy Michelle Hoppe
David J. Horn
Eric J. Hornick
Bertram A. Horowitz
Mary T. Hosford
William Allen Hossom
Linda M. Howell
Long-Fong Hsu
Bo Huang
YinYin Huang
Gloria A. Huberman
John F. Huddleston
David Dennis Hudson
Jeffrey R. Hughes
Carol Irene Humphrey
Paul Jeffrey Hurd
James Hurley
Paul R. Hussian
Li Hwan Hwang
Yu Shan Hwang
Philip M. Imm
Aguedo M. Ingco
Brian L. Ingle
Craig D. Isaacs
Ali Ishaq
Jason Israel
Paul Ivanovskis
Joseph Marino Izzo
Randall Allen Jacobson
Shira L. Jacobson
Pierre-Alexandre Jalbert

John F. Janssen
Joseph W. Janzen
Kamil K. Jasinski
Scott R. Jean
Hou-wen Jeng
Philip J. Jennings
Xiang Ji
Min Jiang
Shiwen Jiang
Weidong Wayne Jiang
Ziyi Jiao
Yi Jing
Christian Jobidon
Philippe Jodin
Betty F. Johnson
Brian E. Johnson
Daniel Keith Johnson
Eric J. Johnson
Erik A. Johnson
Jennifer Polson Johnson
Kurt J. Johnson
Larry Johnson
Ross Evan Johnson
Warren H. Johnson
Luke G.C. Johnston
Steven J. Johnston
Steven M. Jokerst
Bryon Robert Jones
Derek A. Jones
Kelli Shepard-El Jones
Mark C. Jones
Laura Dembiec Jordan
Dana F. Joseph
Gary R. Josephson
Julie M. Joyce
Lisa K. Juday
Amy Ann Juknelis
Jeremy M. Jump
Jeffrey Kadison
James B. Kahn
Kenneth Robert Kahn
Daniel R. Kamen
Scott A. Kaminski
Philip A. Kane
Robert C. Kane

Kyewook Gary Kang
Yongwoon Kang
Mary Jo Kannon
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Sally M. Kaplan
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John J. Karwath
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Lawrence S. Katz
Allan M. Kaufman
David L. Kaufman
David M. Kaye
Howard H. Kayton
Clive L. Keatinge
Susan M. Keaveny
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Cheryl R. Kellogg
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Allan A. Kerin
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Joseph E. Kirsits
Amanda Kisala
Jennifer E. Kish
Scott M. Klabacha
David M. Klein
Susan L. Klein
James J. Kleinberg

Anne Marie Klein-Lee
David J. Klemish
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Brandelyn C. Klenner
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Thomas R. Kolde
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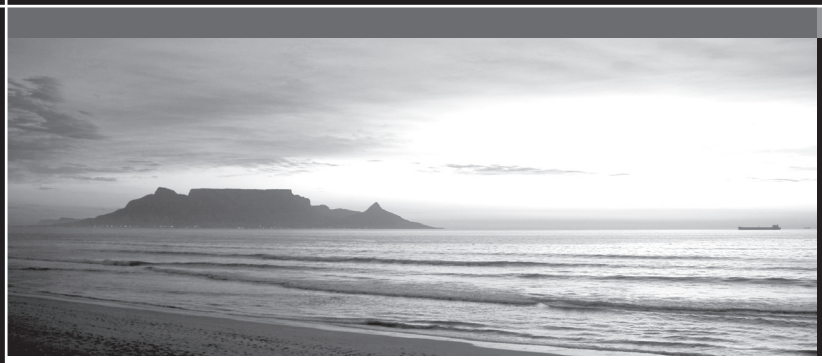
TOP TEN EMPLOYERS WITH THE LARGEST NUMBER OF FELLOWS VOLUNTEERING

Towers Perrin
Milliman, Inc.
The Travelers Companies, Inc.
Liberty Mutual Group
CNA Insurance Companies
Allstate Insurance Company
The Hartford
Deloitte Consulting LLP
ISO
Zurich North America

LARGE EMPLOYERS WITH AT LEAST 50% OF FELLOWS VOLUNTEERING

ACE
Allstate Insurance Company
Aon
Bank of America
CNA Insurance Companies
Deloitte Consulting LLP
Dion, Durrell & Associates, Inc.
EMB America LLC
Endurance Reinsurance Corporation of America
Ernst & Young LLP
Farmers Insurance Group
GuideOne Insurance Group
Guy Carpenter & Co. LLC
Hanover Insurance Group
ISO
KPMG LLP
Milliman, Inc.
Munich Re America, Inc
National Council on Compensation Insurance, Inc.
Navigant Consulting
Oliver Wyman
Pinnacle Actuarial Resources, Inc.
PricewaterhouseCoopers LLP
RBC General Insurance Company
SCOR Reinsurance
Scottsdale Insurance Company
State Farm Insurance Companies
Towers Perrin
United Services Automobile Association
Westfield Insurance
Willis Re, Inc.
Zurich North America



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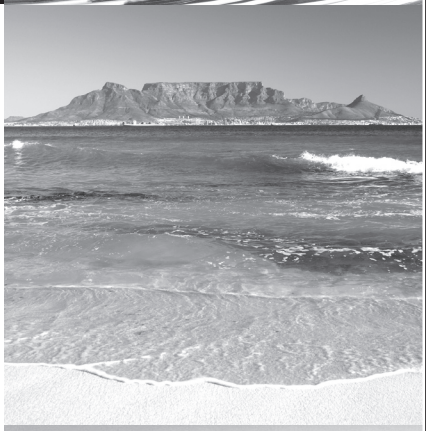

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Actuarial Foundation Update

THE ACTUARIAL FOUNDATION

Foundation Develops Financial Literacy Course

At a time of widespread economic turmoil and financial challenge, it is more important than ever that children are given the knowledge and skills they need to manage their money wisely and to make smart decisions for the future. In response, the Actuarial Foundation has released "Building Your Future," an engaging and relevant financial literacy curriculum to help teens master the foundational elements of personal finance and to prepare for life after high school. To find out more about this new curriculum visit www.actuarialfoundation.org/publications/BuildingYourFuturePR.shtml.

Of 6,000 students who took the Jump$tart personal finance survey in 2006, 62% received failing scores with 60% being the lowest passing grade. Fewer than 30% of high school students take as much as one week's worth of course study in money management or personal finance. Today teens spend nearly 30% of their monthly income just on debt repayment—that's double the percentage spent in 1992. These survey results served as the catalyst for The Actuarial Foundation to develop "Building Your Future," an engaging and relevant high school financial literacy curriculum.

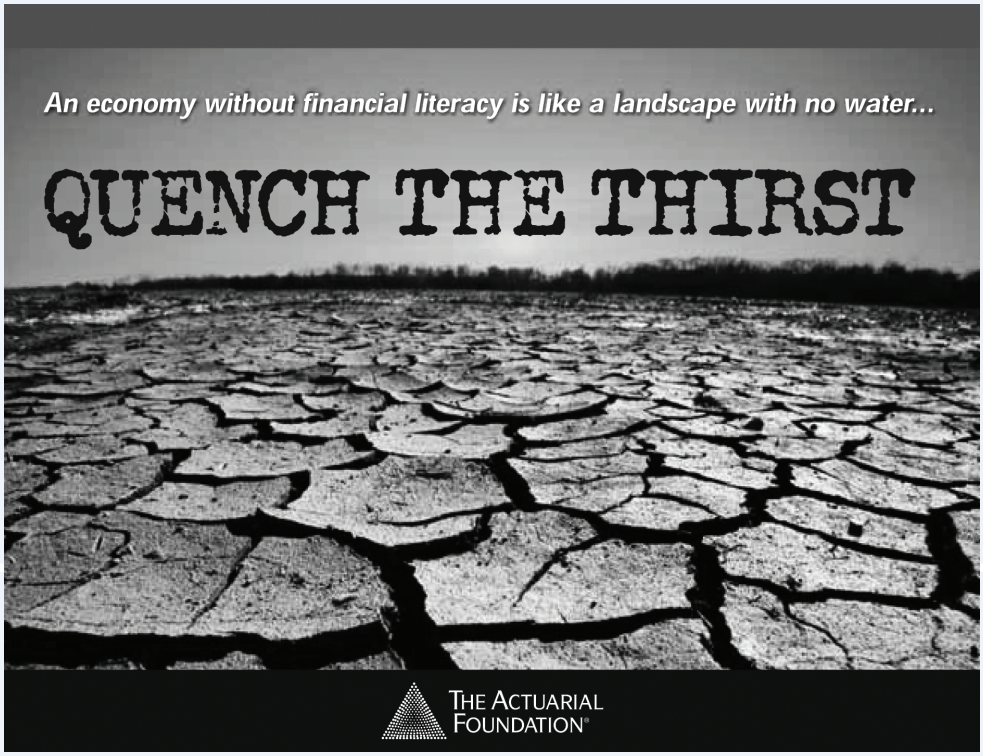
At this time of widespread economic turmoil and financial challenges, teens need to be taught how to manage money wisely so they can make smart decisions today and in the future. The "Building Your Future" curriculum will give teens a reservoir of financial knowledge that they can draw upon for the rest of their lives.

"Quench the Thirst" for a High School Classroom

Your gift of $250 will provide the "Building Your Future" curriculum to a high school of your choosing, or one identified by the Foundation, along with a letter identifying you as the donor. Perhaps you would like to benefit your alma mater, a neighborhood school, or your child's or grandchild's school.

Please join us in this effort to have actuaries make a difference in communities across the country. To begin to "quench the thirst" of students in your community, download a donation form or make an online donation at www.actuarialfoundation.org/donate/index.shtml.

You can view the "Building Your Future" curriculum at www.actuarialfoundation.org/programs/youth/BuildingYourFuture.shtml. AR



Pennies and Dimes

This is an old puzzle, but it's fun. Start with three pennies and two dimes in a line, alternating pennies and dimes. The puzzle is to slide two coins at a time so that you end up with a line of three pennies and two dimes, in that order (see diagrams). A move consists of sliding one penny and one dime, which must be touching. As you slide them, the coins must continue to touch and the one on the left must remain the one on the left. At the end of each move, all coins must be on the same line as they were originally, but this line can be extended to the left or the right. At the end of each move, there can be gaps between the coins, but, of course, at the end, there are no gaps. And, at the end, the coins will not necessarily be in the same place that they were at the start; the whole group might be shifted to the left or right of the original position of the coins. What is the shortest number of moves needed?

Start:

End:

The Joy of International Trade

Two countries, A and B, only produce and consume televisions (TVs) and recreational vehicles (RVs). The happiness in each country is equal to the product of the numbers of TVs and RVs consumed by that country. The production numbers of TVs and RVs in each country is linearly constrained: For Country A, (TVs / 10,000) + (RVs / 2,000) = 1, and for Country B, (TVs / 100,000) + (RVs / 10,000) = 1.

a. The question was, with no trade, how much will each country produce of each. For Country A, this is a question of maximizing $(a \times 10{,}000) \times ((1 - a) \times 2{,}000)$ where a is a number between 0 and 1. This is the same as maximizing $a \times (1 - a)$. You might remember that $a = 1/2$ maximizes this function, or you can take the derivative and see where it's zero, getting the equation $1 - 2a = 0$. So, Country A will produce and consume 5,000 TVs and 1,000 RVs for a happiness of 5 million. Similarly, for B, it will be 50,000 TVs, 5,000 RVs, and 250 million for happiness.

b. It is not difficult to find examples where trade allows happiness to increase for both countries. For example, starting with the numbers in answer a., suppose A exports 100 RVs to B in exchange for 800 TVs. Happiness will then be 5,800 x 900 = 5.22 million for A and 49,200 x 5,100 = 250.92 million for B. If Country A produces only 2,000 RVs and Country B produces $b \times 100{,}000$ TVs and $(1 - b) \times 10{,}000$ RVs, where b is about 0.595, then there is a wide range of trades that make happiness in each country greater than without trade. For example if 10,000 TVs are traded for 1,200 RVs then happiness in Country A is 8 million and in Country B is almost 260 million.

I do not know definitive answers for c. and d., but Jon Evans, who developed the puzzle, suggests the following outcomes are highly likely:

c. Trade allowed but final market prices must equal overall average exchange prices: If H is happiness then (dH/dTVs)/(dH/dRVs) = (TV market price) / (RV market price), which for each country will be (RVs consumed) / (TVs consumed). Country A will produce only RVs because its capacity is much smaller and it is much more efficient at producing RVs compared to Country B. Country B will then maximize its happiness by producing 51,270 TVs and exporting 7,460 TVs to Country A in exchange for 1,000 of the 2,000 RVs Country B produces. Happiness will be 7.46 million for Country A and approximately 257.3 million for Country B.

d. Trade without the price constraint: Bargaining will result in a Nash Arbitration Point, maximizing (UA – UA*) (UB – UB*), where UA and UB are the final outcome happiness numbers and UA* and UB* are the "status quo" happiness numbers corresponding to the answers in a. Assuming Country A only produces RVs, one numerical algorithm indicates that Country B produces 60,000 TVs and exports 8,593 of them in exchange for 1,141 of Country A's 2,000 RVs, resulting in happiness numbers of about 7.4 million for A and 264.3 million for Country B.

David Uhland sent in solutions to Parts a., b., and d. We will report on his comments on Part d. in a future issue. Because of the difficulty of this puzzle, we will be happy to report in future issues on any solutions to parts c. and d., or comments on Jon Evans' solutions that anyone cares to share.

KAREN MORGAN

An Oldie but a Goodie

The Goal: A Process of Ongoing Improvement by Eliyahu M. Goldratt and Jeff Cox (North River Press; 1984 First Edition, 1986 Revised First Edition, 1994 Revised Second Edition, 2004 Revised Third Edition; $24.95)

"He goes around claiming that we can make a lot of money if we sell below what it costs us to produce. That is pure baloney." Or is it? Eliyahu Goldratt proposes just that in *The Goal: A Process of Ongoing Improvement*. No, he isn't proposing to sell everything at a loss. Instead, Goldratt develops unconventional steps to help every company meet its ultimate goal: to make money.

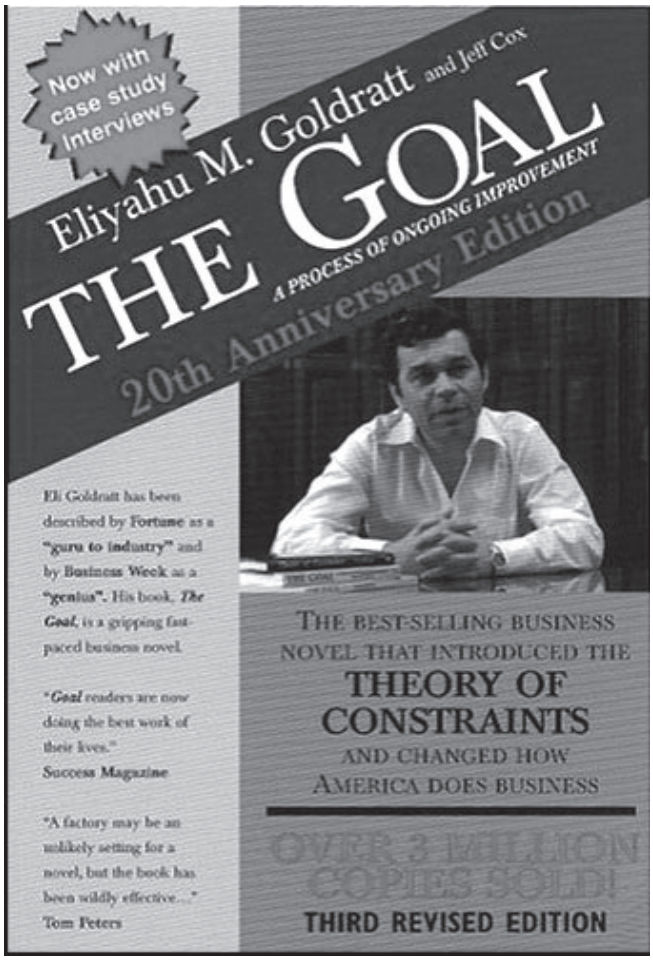
I was first introduced to this book during an undergraduate statistics course while studying at the University of Michigan. The class was taught by a professor who had worked with William Edward Deming, an American statistician best known for revolutionizing Japan's automotive industry by improving product quality and product design and, therefore, sales. My professor was determined to teach an alternate management method to students before they became "brainwashed" by the business school's dogmatic management techniques. Unlike most books that I read during college, this one left a lasting impression. Its techniques seemed common sense and I remember wondering why all companies didn't simply follow the model laid out within it. Rereading this book after a few years of work experience has not changed my perception of it. Rather, I now better understand the terms used and have even encountered a mainframe computer (the book was originally published in 1984 and, to my naïve disbelief, these mainframes still exist!). Yet, the principles remain useful and effective. *The Goal* remains relevant after 25 years and is an excellent resource for using statistical fluctuations and dependent events to create a larger profit.

Alex Rogo, the main character, is a plant manager who is juggling a disappointing metal fabrication plant and a deteriorating marriage. At an airport, he runs into a physics professor from his college days and mentions his factory to him. The professor, Jonah, asks some pointed questions that lead Rogo to acknowledge that although high productivity and the use of robotics appear great, profit is declining. Rogo's plant later becomes slated for closure unless he can show improvement within three months. He relies on Jonah to teach him a new management system that he uses to save his plant and even his marriage.

Goldratt uses all 337 pages of *The Goal* to outline his Theory of Constraints. All processes, including the assembly of metal parts in the book, are a series of dependent events with statistical fluctuations. In order to make the system most effective, the statistical fluctuations must be understood and the system must use the constraints efficiently. For example, Rogo has a breakthrough when chaperoning his son's Boy Scout hike along a narrow trail. The slowest kid, Herbie, keeps falling behind and the line in front of him keeps stretching out, because the kids in front are walking much more quickly. The quickest hikers generally have no space between them and the kid in front of them. He realizes that even if the quickest hikers slow down to tie their shoe or adjust their pack (i.e., walk slower than their average rate), they catch up because their average pace is faster than that of the kid in front of them. However, if a hiker who is slower than the hiker in front of him pauses, he never regains his original spacing and the line of hikers expands. Herbie is slowing down the whole group because Rogo has to keep all of the kids in viewing distance and has to call ahead for them to wait. Rogo puts Herbie in the front of the line, which solves his dilemma of keeping the scout group together, since everyone has to walk as slowly as Herbie does. To increase the group's rate of speed, he redistributes Herbie's pack (which just happens to include a 6-pack of soda, a collapsible steel shovel, and a jar of pickles thrown in for good measure) among the quickest hikers' and his own packs, allowing Herbie to walk more quickly. Rogo realizes that the system is hiking the trail together, a hiker's speed is dependent on the hiker's speed in front of him, the changes in pace are statistical fluctuations, and Herbie is the constraint on his system. Even though the quickest hikers are not hiking at their most efficient rate, the system is moving at its fastest collective rate because it is moving at the constraint's fastest speed. So, even though hikers are not individually efficient, the system's constraint is efficient and therefore the system is running at its highest efficiency.

Goldratt balances the flow of management information with character development and an engaging story line. The reader can relate to the main character's life and hopes for his victories in the plant and in his family life. The reader either keeps pace with his discoveries or feels clever by figuring something out before him. The novel never feels slow-paced, though, and the reader understands Goldratt's Theory of Constraints in detail by

the end. Each breakthrough is summarized in multiple ways so that readers can learn by theory, factory examples, charts, or real-life examples such as the scout hike. Rogo or his team even misstep in some instances. When they think about the system thoroughly, they catch their mistakes and advance with their process of ongoing improvement, giving the reader hope for his or her own false starts.



Though this novel focuses on production and operations management, systems thinking can be used to improve any type of process, from managing office work or clients to getting dinner on the table. Ever notice that people with a well-stocked pantry don't always know what to make for dinner? They tend to buy whatever they feel like buying at the grocery store and then make a quick trip back to the store every day to get necessities that they somehow don't have in stock. Instead, they should create a goal for this system of eating dinner such as to save money. Then, they could make a weekly meal plan and buy only the ingredients that they need (i.e., only manufacture the parts needed). They wouldn't have an overflowing pantry (excess inventory), they would have lower grocery bills and make less trips to the store (operational expenses), and the food would be eaten before it expires or is donated to a food pantry (product would be sold).

The Goal also includes the importance of diversity of thought. Jonah is a physics professor who uses the Socratic Method to teach a manager with an MBA how to run a factory profitably. Accounting, production, information technology, marketing, and management all have representatives within the book who contribute to Rogo mastering the Theory of Constraints. People can accomplish more together by complementing each other's strengths and weaknesses than by the sum of their individual efforts.

This book is not written specifically for actuaries or statisticians, but for management. Many actuaries are managers and this will be an excellent book, as it applies across so many situations. Goldratt very carefully leads the reader through his theories and it is best to read the book rather than trying to list possible applications. If the reader doesn't understand the "why" behind the systems management and theory of constraints, they won't be able to effectively apply the 'how' part.

Goldratt has produced a business novel that is surprisingly addictive as well as instructive. It is a must for those interested in maximizing potential and improving their management skills. I highly recommend this book.

Karen Morgan is an actuarial analyst with Foremost Insurance Company in Caledonia, MI.

MARTY ADLER

Sax in Brazil

David Sommer has been playing the saxophone since the fifth grade. He had started on the trumpet while his brother started on the saxophone, but after three days his brother found it too heavy to carry back and forth to school and asked Dave to switch. (I can relate to that. I, too, carried the saxophone to junior high and high school for several years. The difference is that I had no special talent.) He has been playing in bands since the sixth grade. His debut was actually on the trombone, which he hastily took up when his saxophone broke a week before a school concert. After that, he regularly played in two or three bands—concert, stage, and small groups. He also played in community concert and jazz bands and community theater orchestras. In high school, when the music program was cut due to California Proposition 13, he organized a band to continue to play at sporting and other events. The band received such support that the school reinstated the music program the following year.

Dave Sommers performs.

Dave has played just about everywhere he has lived—San Francisco, San Diego, Columbus, Philadelphia. He has played with musicians such as Dizzy Gillespie, Ed Shaughnessy, Richie Cole, and Bobby Shew. He even toured with the Glenn Miller band for two weeks, opening with "In the Mood" and closing with "Moonlight Serenade" at every show.

Then in February 1999, Dave moved to Brazil. In September of that year, he really got "plugged into" the music scene. At the invitation of one of the partners in his company, he went to a local bar in Rio de Janeiro where they were playing blues. The partner introduced Dave to a friend and they started talking about music, including Dave's evaluation of the band playing. Impressed with his thoughtful responses about each of the musicians, the man asked him to sit in with his band the following week. When Dave showed up in the middle of the first set, the house was packed. When Dave asked why there were so many people that week, someone responded, "Didn't you hear? There's going to be an American sax player sitting in tonight!" No pressure! Well, it went pretty well, because they have been playing together, on and off, ever since.

When Dave moved to Brazil, he thought he would get opportunities to play bossa nova and jazz, but the invitations have been more toward American music. The band in Rio plays blues—its name is Blues and Beer—and his band in São Paulo plays more "danceable" music—soul and some disco.

The type of music really drives the way Dave feels while he is playing. When playing dance music, the key is rhythm and groove, so he really gets into moving with the music. When he plays blues or jazz, it's a much more creative experience, with more interplay between the musicians. "But the great thing about playing any kind of music is that you have to focus on the music, so you are forced to escape 'the real world.'"

When he was actuarial director for Liberty Paulista Seguros, some people who had heard him play pressured the VP of sales to invite his band to the annual sales conference. After the show, one of the branch managers commented to him, "If you can do

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Variance Prize Winners for 2007 and 2008 Named

The *Variance* Editorial Board has selected the prize-winning papers from the publication years 2007 and 2008. The authors and their papers are:

- R.J. Verrall, for "Obtaining Predictive Distributions for Reserves Which Incorporate Expert Opinion," published in Volume 1, Number 1 (2007), and
- Martin Eling, Thomas Parnitzke, and Hato Schmeiser for "Management Strategies and Dynamic Financial Analysis," published in Volume 2, Number 1 (2008).

R.J. Verrall

Martin Eling

Thomas Parnitzke

Hato Schmeiser

Richard Verrall is professor of actuarial statistics and head of the Faculty of Actuarial Science and Insurance at Cass Business School, City University in London. He has published many papers on claims reserving, and was awarded first prize in the 1993 CAS prize paper competition on the subject. He has lectured widely on the variability of loss reserves and has taught courses on stochastic reserving.

His prize winning *Variance* paper uses the reserving methods chain-ladder and Bornhuetter-Ferguson to illustrate how expert opinion can be inserted into a stochastic framework for loss reserving.

Martin Eling is a professor of insurance and director of the Institute of Insurance Science at the University of Ulm (Germany). He previously served as a visiting assistant professor at the University of Wisconsin-Madison and senior research fellow at the University of St. Gallen in Switzerland.

Thomas Parnitzke is a risk manager for Bâloise Holding AG, in Basel, Switzerland. His research interests include dynamic financial analysis, risk management, and solvency analysis.

Since 2005, Hato Schmeiser has been chair of the department of risk management and insurance at Switzerland's University of St. Gallen. A prolific author, Dr. Schmeiser's research interests include individual financial planning, DFA, option pricing, and financial firm regulation.

The aim of the 2008 prize-winning paper was to study the effects of different management strategies on a nonlife insurer's risk and return profile. The authors develop several management strategies and test them numerically within a DFA simulation study.

Dr. Verrall is scheduled to present his paper at the 2009 CAS Annual Meeting in Boston. Dr. Eling, Mr. Parnitzke, and Dr. Schmeiser will present their paper at the CAS Spring Meeting in 2010. The *Variance* Prize is currently $5,000 per publication year.

Read the *Variance* Prize papers on the Variance Web Site at www.VarianceJournal.org. AR

Advancing the Science of Risk
Variance

Bayesian Analysis with the Metropolis-Hastings Algorithm

In a Bayesian analysis, computing the posterior distribution can be difficult. Given a conditional distribution with probability density, $f(x|\mu)$, and a prior distribution, $g(\mu)$, the posterior distribution is given by

$$f(x) = \int_0^\infty f(x|\mu) \cdot g(\mu) d\mu .$$

If, for example, $f(x|\mu)$ is given by a Tweedie[1] distribution and $g(\mu)$ is given by a gamma distribution, the integral does not have a closed-form solution. While numerically evaluating this integral may be feasible if μ has only one or two dimensions, it is practically impossible when μ has many dimensions.

A recent trend in Bayesian statistics has been to use Markov Chain Monte-Carlo (MCMC) methods to produce a sample $\{\mu_t\}$ to describe the posterior distribution of μ. This article describes one of the more prominent MCMC methods called the Metropolis-Hastings algorithm.[2]

First, let's describe the idea behind MCMC methods. A Markov chain is a sequence of random variables that randomly moves from state to state over discrete units of time, t. The probability of moving to a given state at time t, depends only on the state at time $t-1$. The term "Monte-Carlo" refers to a computer-driven algorithm that generates the Markov chain.

The Metropolis-Hastings algorithm starts with a proposal density function, p, and an initial value, μ_1. It then generates successive μ_t's according to the following simulation algorithm.

1. Select candidate value, μ^*, at random from a proposal density function $p(\mu^*|\mu_{t-1})$.
2. Compute the ratio

$$R \equiv R_1 \times R_2 = \frac{f(x|\mu^*) \cdot g(\mu^*)}{f(x|\mu_{t-1}) \cdot g(\mu_{t-1})} \times \frac{p(\mu_{t-1}|\mu^*)}{p(\mu^*|\mu_{t-1})} .$$

3. Select a random number U from a uniform distribution on (0,1).
4. If $U < R$ then set $\mu_t = \mu^*$. Otherwise set $\mu_t = \mu_{t-1}$.

The first part of the ratio R, i.e. R_1, represents the ratio of the posterior probability of the proposal, μ^*, to the posterior probability of μ_{t-1}. The higher the value of R_1, the more likely μ^* will be accepted into the chain. Most of the time, μ_t will randomly walk through the high density regions of the posterior distribution of μ.

An example of a proposal density function would be $p(\mu^*|\mu_{t-1}) = \Gamma(\mu^*|\mu_{t-1}/\alpha, \alpha)$, a gamma distribution with shape parameter α, and scale parameter μ_{t-1}/α. The mean of this gamma distribution is μ_{t-1}, so the proposal, μ^* will be centered at μ_{t-1}. The ratio R_2 above serves to correct for biases brought about by the random selection of μ^* from the distribution described by p.

The convergence rate is controlled by the variability of the proposal density function. A low variability of μ^* will have the result that μ_t moves slowly and convergence will be slow. A high variability of μ^* will lead to frequent jumps to areas with low posterior density and hence low values of R_1, This in turn leads to more frequent rejections of μ^* in Step 4 of the algorithm, with $\mu_t=\mu_{t-1}$, and slower convergence of the distribution of μ_t. The practice that seems to be evolving among Bayesians is one of choosing a proposal density volatility parameter that results in an acceptance rate in Step 4 of about a 50% for single parameter posterior distributions, and about 25% for multi-parameter posterior distributions.

It has been demonstrated mathematically that as t approaches infinity, the distribution of the μ_t's converges to the posterior distribution of μ.

Let's look at an example.[3] Suppose we have 25 observed losses shown in the table below.

y	0	1	2	3	5	8	10	12	16
Freq	8	6	2	2	2	1	1	1	2

We want to model the losses with a Tweedie distribution with parameters $\phi = 1$, $p = 1.5$ and unknown mean, μ. The prior distribution of μ is a gamma distribution with mean 5 and standard deviation 5. To illustrate the effect of the choice of the proposal distribution, I ran the Metropolis-Hastings algorithm using the gamma proposal distributions with $\alpha = 2500$ (low volatility) and $\alpha = 25$ (volatility just about right.) The acceptance rate for the first run was 95%. Figure 1 shows a trace plot of the values of μ for iterations 1 to 6,000. The acceptance rate for the second run was 57%. Figure 2 shows a trace plot for its values of μ.

[1] See my "Brainstorms" column in the May 2009 *Actuarial Review* for a description of the Tweedie distribution.

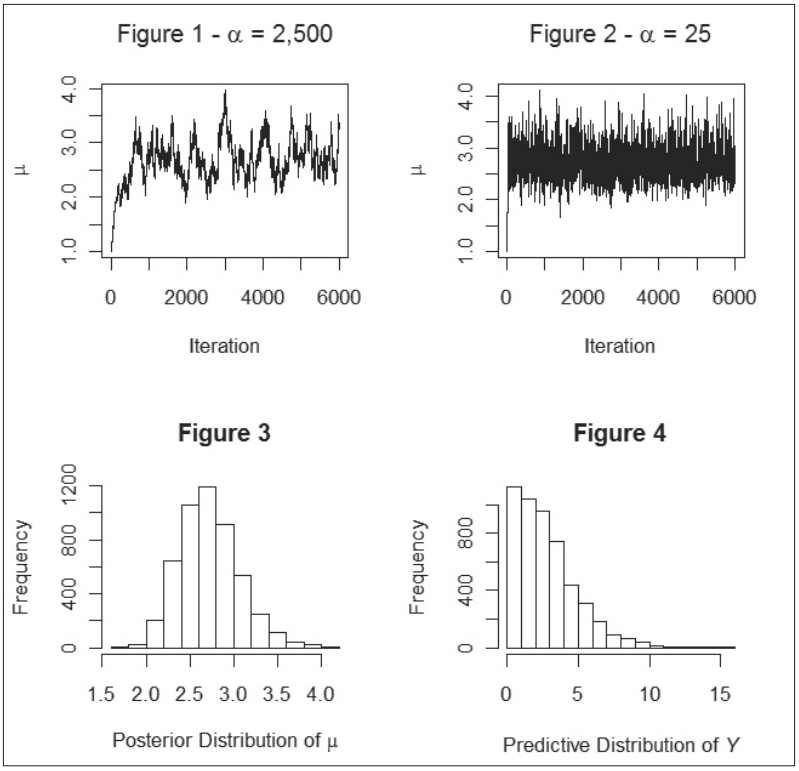
[2] Books that describe MCMC methods include: (1) *Bayesian Computation with R* by Jim Albert; and (2) *Introduction to Applied Bayesian Statistics and Estimation for Social Scientists* by Scott M. Lynch.

[3] The R code that generated this example is on the CAS Web Site accompanying the Web version of this article.

The second run converged more rapidly than the first. Note the high degree of autocorrelation in the first run. In theory, if I had increased the number of iterations, a histogram of the μ_t's would more accurately represent the posterior distribution. We need a sample with a large number of "cycles."

In both runs, the selection of $\mu_1=1$ was outside the high density region of the posterior distribution. To account for a possible poor choice of starting values, Bayesian statisticians recommend ignoring the initial iterations, calling it the "burning period." Figure 3 gives a histogram of the μ_t's generated by iterations 1,001 to 6,000 of the second run. This sample represents the posterior distribution of the mean, μ. Or as we actuaries like to say, the "range of reasonable estimates."

While a range of estimates is nice in theory, in practice we observe outcomes. To get the predictive distributions of outcomes, I selected a random Y_t from our Tweedie distribution with mean μ_t, for each t in the second run. Figure 4 gives the predictive distribution of outcomes.



In other applications, μ could represent a vector containing a large number of parameters. The math for the Metropolis-Hastings algorithm for multi-dimensional models, such as those found in loss reserving, is similar to what I described above.[4] The recent developments in MCMC methods enhance our ability to do practical Bayesian analyses for our actuarial problems. AR

[4] A paper using the Metropolis-Hastings algorithm, "Model Uncertainty in Claims Reserving within Tweedie's Compound Poisson Models," by G.W. Peters, P.V. Shevchenko and M.V. Würthrich, appears in the May 2009 *ASTIN Bulletin*.

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pricing as well as you play, we're in great shape." Dave responded, "If I could play as well as I do pricing, I wouldn't be here."

Dave's band rehearses for two hours a week. He feels that he doesn't spend nearly enough time practicing because of his work schedule. Thus he doesn't do any writing or arranging anymore. But he hopes to organize his professional life in a way that allows more time for music. When he retires, he hopes to be a full-time musician.

Some of Dave's work has been recorded, although the amount is pretty limited so far. When he played with a big band (17 pieces) in Philadelphia, they recorded an album. He also participated on a few tracks of Blues and Beers' second album. "The hard part about recording is what you lay down has to be perfect, because that is what is going to live on forever, so you can't play the same phrase two different ways."

When he moved to Brazil, his Portuguese vocabulary was four words—hello, thank you, premiums, and claims. While he had some sporadic lessons, he learned a lot by reading grammar books and talking to people without fear of being wrong. He says that people from Rio de Janeiro are very friendly and talkative. He also traveled a lot during that first year in Brazil. By the end of the year he was able to handle meetings in Portuguese without translation.

When I asked, "Why do you want to remain in Brazil?" Dave responded, "It's hard to explain to someone who has never been. I think the biggest thing is the human warmth—when you walk down the street, people look at each other and smile. And people here tend to be happy with what they have instead of focusing on what they don't have. (The concept of keeping up with the Joneses doesn't exist here.) And I feel that, by sharing my knowledge here, I'm making a difference in the insurance market, helping to improve the way it works and the way actuaries here think, instead of being just one more consultant. That is very satisfying."

Dave Sommer is sócio diretor (managing partner) of EMB America Latina in São Paulo, Brazil. AR

PAUL E. LACKO

Sustaining the Quality of the CAS Designation

The first two CAS exams were called Part 1 and Part 2 way back when I sat for them. Part 1 covered calculus, as best I can remember, and Part 2 covered probability and statistics. Ever since I passed those exams, I have wondered why it was even necessary. I passed both, but that was no great achievement for an undergraduate math major at a Big 10 university who also spent two years in an economics graduate program that was also heavy on mathematics. Why not just send in my college transcript as evidence of an adequate understanding of the material? Why go through it all over again?

I was less than overwhelmed by the advanced mathematics I encountered on the later exams. "What advanced math?" you may ask. That is my point exactly. There's hardly a derivative in sight anywhere, although you will stumble across a stray integral here and there, especially in Advanced Ratemaking.

The early exams include Loss Distributions these days, which does mean more integrals and even a few complex variables, if you know where to look for them. Still, grades of A or B in any probability/statistics sequence at an accredited college or university in the U.S. or Canada is probably good evidence that a student can handle the mathematics that will arise in applied, practical actuarial work. Having to relearn calculus and probability/statistics in order to pass the first two CAS exams always struck me as pointless. Calculus was taken off the CAS exams years ago. Probability and statistics are still in.

Students in college actuarial science programs have an advantage over other students now. Whether or not it's explicitly stated, courses in actuarial science programs are geared specifically to preparing students to pass the early exams. (If they weren't, why would someone enroll in the first place?) Again, an A or a B should pretty much establish that a student has successfully studied, learned, and mastered the material sufficient to pass the CAS exams.

On the other hand, I see three flaws with this analysis that stem from the differences between a college class and a CAS exam. First, homework and classroom attendance count for 0% of a CAS exam grade. Results mean everything; effort means nothing. Second, the CAS exam covers all the course material on a single exam. Most college courses test the material one section at a time, and some instructors give a final exam that covers only the last sections of material. Third, passing an actuarial exam requires a score that, at least in the current education structure, is above 50% of the total points. A college instructor might award A and B grades even if no student in the class gets more than 40% of the possible points. ("Hey, it was a difficult exam! It wasn't their fault, and there's no reason to penalize the students who are obviously above average!")

Is a single, comprehensive test of all course material superior in any way to a sequence of exams during the school term? After an exam is over, the material fades from one's mind. Does it really matter whether the student forgets one piece at a time during the term or all at once after the final? Few students would be able to get as high a score two weeks later—assuming no additional preparation time—on another exam of similar difficulty.

The other points relate to how a student earns a college course grade, and whether this course grade means the same thing as a passing grade on a test written, given, and graded by the CAS itself. The instructor might claim to test at the same level of difficulty as the CAS, but the only serious way to verify that claim is to actually verify that claim. The CAS needs to see each exam *and* a sample of papers (with names redacted) to review the grading. This has to be done for every instructor every year, every time one of the instructor's students applies for CAS exam credit without passing the CAS exams.

Can the CAS effectively police the probability/statistics instructors at every North American institution of higher learning? Maybe. Would CAS members be willing to pay for it? Not likely. Would the students at those institutions be willing to pay the full cost of it? Not a chance.

Quality is vital to the exam process. If the CAS designations are to continue to be meaningful, they must mean the same things to everyone. We cannot afford to hand off our quality control to some other inspection service, nor can we afford to control quality outside our own sphere. So, I have changed my mind after thirty years. Now I believe that the only way we can maintain the quality of the exams and the CAS designations is to award someone credit for a CAS exam only when that someone passes a CAS exam.

I hate changing my opinion after so many years. Please, if you see reasons why I should change it back, please say so in a letter to the editor. I won't be the editor in chief, but I will read your letter. Grover Edie (FCAS 1987) is now the editor in chief of the *Actuarial Review*. Thank you, Grover, for volunteering to

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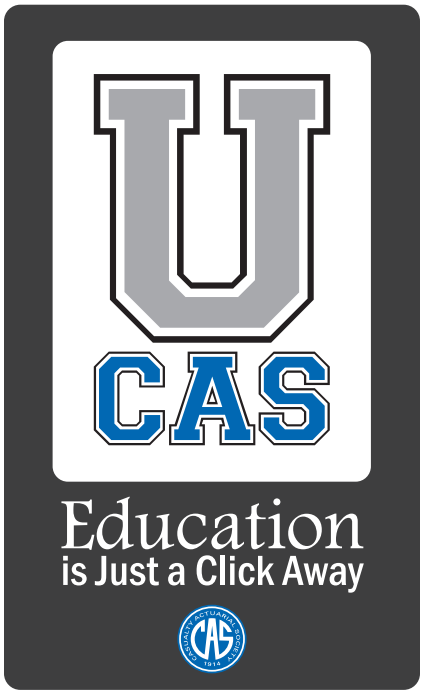
New Sessions Offered through University of CAS

The University of CAS (UCAS) represents the Casualty Actuarial Society's ongoing commitment to provide convenient educational opportunities to practicing actuaries. UCAS offers recorded sessions that were presented at CAS meetings and seminars. The recordings, which feature audio synched with PowerPoint presentations, are made available online through an easy-to-use interface.



Launched in June 2009, the initial UCAS offerings consisted of sessions from the 2009 CAS Spring Meeting and Reinsurance Seminar. More recently, sessions from the Casualty Loss Reserve Seminar and Underwriting Cycle Seminar have been added.

Access to sessions is free for attendees of the meeting or seminar at which the sessions were originally presented. This allows members to extend the value of their event registration and benefit from sessions they were not able to attend on-site.

Access by members who did not attend the meeting or seminar can be purchased for:

Seminars	Meetings
$25 per individual session	$25 per individual session
$149 for the complete set of recorded sessions	$99 for the complete set of recorded sessions

The Webinar Series is another recent addition to UCAS. So far, four CAS Webinars have been posted to UCAS, and most Webinars offered by the CAS in the future will be available. Current Webinar sessions include:

- Demystifying Insurance Pricing—The Basics
- Economic Capital 101—A Primer on Economic Capital Issues for P/C Insurers
- From Risk to Opportunity—Insurer Responses to Climate Change
- Professionalism and the Practicing Actuary

Members have found many benefits from accessing sessions through UCAS. Sessions are affordable and participation requires no travel or time away from the office. UCAS provides another opportunity to meet continuing education requirements and keep up-to-date with current practice.

Visit the online university at http://www.softconference.com/cas/ and take advantage of a growing database of sessions. At UCAS, education is just a click away! AR

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take my place. Thank you to all the *AR* volunteer staff, current and past members alike, for turning out a publication every three months that I have been proud of. You've all done so much of the work, and you deserve much of the credit.

Managing Editor Elizabeth Smith of the CAS staff deserves even more of the credit for producing each edition of the *AR*. (Grover, working with Elizabeth has been the best part of the job!)

Nora Young (ACAS 2000) and Bryan Young (FCAS 1982) are also leaving the volunteer staff after about eight years of service each. Shama Sabade (ACAS 1997) has volunteered to join the volunteer staff as a copy editor, and Germain Denoncourt (FCAS 1993), based in Montréal, has volunteered for the new position of Canadian correspondent for the *Actuarial Review*. Look for his columns beginning in February 2010! AR

November 15-18, 2009
CAS Annual Meeting
The Westin Boston Waterfront
Boston, MA

December 1, 2009
Global Best Practices in ERM for Insurers and Reinsurers Webcast

December 3, 2009
Actuarial Leadership: A Call to Action Webinar

March 7-12, 2010
International Congress of Actuaries 2010
Cape Town, South Africa
http://www.ica2010.com/

March 15-17, 2010
Ratemaking & Product Management (RPM) Seminar
The Fairmont Chicago, Millennium Park
Chicago, IL, USA

April 12-14, 2010
Enterprise Risk Management Symposium
Sheraton, Chicago, IL, USA

May 2-4, 2010
Seminar on Reinsurance
New York City, NY, USA

May 23-26, 2010
CAS Spring Meeting
Hotel del Coronado
San Diego, CA

June 3-6, 2010
6th Conference in Actuarial Science & Finance
Samos, Greece
www.actuar.aegean.gr/samos2010/

September 20-21, 2010
Casualty Loss Reserve Seminar (CLRS)
Disney's Contemporary Resort
Lake Buena Vista, FL, USA

In Memoriam

August J. Linquanti
(ACAS 1968) 1925-2009

Carl L. Wilcken
(FCAS 1960)1929-2008

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, puzzlement solutions, etc.

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