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My Section Council Intern Experience

By Abby Conrad

“AOF stands for actuaries of the future, not just actuaries of the past—evolve or become extinct.”

As a college student, the evolution of my chosen career field is important to me. Most students are aware of the current state of the actuarial profession, but are uncertain of future actuarial opportunities. One of my personal goals is to assess and acquire the skills an actuary will need to survive and succeed in a rapidly changing world. My experience this past year as the Section Council Intern (SCI) for the Actuary of the Future (AOF) Section helped get me closer to achieving this goal.

As the SCI, I was an affiliate member of AOF, and I was given the opportunity to participate in the section’s initiatives throughout the year. AOF is unique in offering internship opportunities, and is currently in the second year of its internship program. Some of the rewarding initiatives I was fortunate to be involved in throughout the year included attending the yearly AOF planning meeting, creating an AOF brochure to attract new members and assisting in a podcast project.

Early in my term as the SCI, I attended the yearly planning meeting in Chicago, Ill. At this meeting the AOF council set goals and brainstormed ideas for the upcoming year. I found this meeting exceptionally beneficial. I was able to engage in conversation with highly experienced and intelligent actuaries. At the same time, I was afforded the opportunity to provide the council with insight from the perspective of an actuarial student. This meeting was an enthusiastic and motivational start to the upcoming year.

My main project as the SCI was to create a brochure for AOF to use as a recruiting tool for new members and to be distributed to renewing members. The brochure answered many of

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CHAIRPERSON'S CORNER

FSA=mc²?

By Dave Snell

This year, I was honored to be a keynote speaker at the Actuarial Research Conference (ARC). It was held in Winnipeg at the University of Manitoba. For me, it was both a humbling and a gratifying experience.

I say humbling because within the first hour I realized I was probably the least formally educated speaker. Most of the others had both FSA and Ph.D. designations and their sessions had titles that I did not understand ... and those were just the titles! Years ago, I felt pretty confident about calculus and other so-called 'higher mathematics' subjects. I was the lone engineering major in my class who insisted on taking the theoretical track for math majors in addition to the applied mathematics track for engineers. In our theoretical classes, untainted by applications, we once spent two weeks of class time proving the existence of a solution to a certain type of partial differential equation. At the end of the two weeks, we had no clue how to solve it, but we proved conclusively that a solution existed. In the engineering math classes we would have calculated a solution within 20 minutes—whether or not it existed! There is a value to both perspectives, but they sometimes are not in harmony.

Getting back to the ARC, I was quickly intimidated by the plethora of PowerPoint slides that were covered with integrals, transform symbols and Greek characters. Many of these presentations looked like they were ideal for the *North American Actuarial Journal* (NAAJ). I really look forward to the *NAAJ*. When a new issue arrives, I eagerly look through it in hopes of finding an article I can understand. When I do, I feel elated. Sometimes I do not get to feel elated. Still, I can leave it conspicuously on my desk and then programmers or underwriters who stop by often infer that I am smarter than I really am. It's a great publication.

The feelings of gratification came later during the conference, when several attendees came up at various times to thank me for a presentation they could understand and enjoy. In fact, one attendee suggested to me afterward that I should rename the presentation "Simplicity" because she was originally having misgivings about attending a lecture on a complicated topic, but she came away feeling like she understood me. Many were truly excited about going back and delving into genetic algorithms, or other complexity (simplicity?) topics. I enjoy sharing my enthusiasm for the new set of tools and techniques that we now have available to actuaries, and I am impressed by the bright young minds that take my simple ideas and extend them to very useful applications.

My point here is that actuaries sometimes tend to be highly technical. We need that orientation to do breakthrough research. We also want to make sure that our models and conclusions are based on rigorous application of theory. After all, they must model the complex risk analysis problems that our public depends on us to analyze for them.

In addition to this attention to technical details we need to be able to communicate our ideas in a manner understandable by the less technically oriented population who want the benefit of our expertise. Let's look at a simple example from Einstein: When you can take a subject as complicated as relativity theory, and pare all the daunting Lorentz transformations and the dozens of supporting equations down to something as concise and understandable as $E = mc^2$, you are hailed as the greatest scientific brain of the century.

The public does not need an advanced degree in physics to get the idea that a small amount of mass can be the source of a huge amount of energy. In fact, a single gram of mass contains the energy equivalent of burning 568,000 gallons of gasoline (http://en.wikipedia.org/wiki/Mass%E2%80%93energy_equivalence) but even folks who do not do the conversions can understand the basic idea—that when you convert mass to energy you multiply it by a very big number. Einstein was not the great technical wizard who claimed to understand quantum physics, and several scientists prior to him proposed that there was a relationship between mass and energy. Part of his genius, though, was the ability to summarize it—to make it understandable.

At ARC, I had the pleasure of chatting with Mary Hardy, who has a daunting list of credentials: FSA, CERA, FIA, Ph.D. She is the editor of the *NAAJ* so you can be fairly confident that she is comfortable with mathematics that I would find incomprehensible. Yet, she shared that one of the papers for which she was most proud was one that did not get a very impressive reception from the academic community. She said it was not deemed rigorous or technical enough for them. It was the introduction of a measure of risk she and her co-author, Julia Viinikka, called the CTE, or Conditional Tail Expectation. The CTE is now widely used throughout North America as a major standard of risk measurement. Most of you have used or at least read about CTEs. I even talk about it in my introduction to complexity sciences. It's a simple way of expressing risk. The mathematics behind it is complicated for non-mathematicians, but the result is understandable by actuaries and by management.

AOF is the section that has an enormous influx of younger, brighter actuaries who are very competent technically. Some of you can juggle the calculus, the Greeks, and the matrix algebra, and perhaps even chew gum and solve Sudoku puzzles at the same time. I urge you to also learn to communicate your results to less technically astute populations. Wouldn't it be great if the next breakthrough idea in the media happened to be from an actuary?

Consider becoming the rock star of risk. $FSA=mc^2!$ ☆



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the typical questions of an actuary interested in joining the section, such as, “What is AOF?” and “What are the benefits of joining?” The content of the brochure pertained to all actuaries, regardless of the various stages of their careers. Creating the brochure allowed me to better understand the main goals and initiatives of AOF.

I was also able to assist with the creation of a podcast. The podcast initiative began with the previous SCI. I produced a short episode with the help of an experienced actuary on the section council. It was beneficial to gain

firsthand experience in the production of a podcast. It was also a fun project!

Not only did my year as the SCI provide me with learning opportunities and new openings to build my actuarial career, but I was able to serve as AOF’s link to the future generation of actuaries. I have benefited greatly from the many experiences that were a part of this initiative, and I am extremely grateful to all who have contributed to the creation of this position. ☆

Weakness in an Actuarial Process and Ideas for Improvement

By Madeleine Zhang



Madeleine Zhang is an actuarial student at Simon Fraser University in Vancouver, Canada. She can be reached at madeleine_zhang@sfu.ca.

WHAT IS AN ACTUARIAL PROCESS?

A process is a series of steps we take to achieve a goal. When you want to make a new dish, you may go find a recipe. It tells you what ingredients you need, the amount you need and how you will cook them precisely.

An actuarial process is the recipe actuaries follow. Like a chef, we need some ingredients to start with, and for us it is usually data. Our fridge would be a centralized place that stores the data, such as database systems or shared drives. We prepare our ingredients by using tools, be they spreadsheet, database software or actuarial software which helps us manipulate the data. Then, we use the tools that we select to perform the calculations—our cooking step! Lastly, we summarize and present the results and our analysis to someone who will use them to make decisions.

WEAKNESS IN AN ACTUARIAL PROCESS

You will follow a recipe carefully when you make a dish, as you know that a little variation may drastically change

the quality of the product. Similarly, in a much more complicated valuation project, a small error can also create a huge difference in the calculation of reserves.

Although many of us are comfortable with the way we work now, we may be unaware of, or neglect, risks that exist in our actuarial processes.

When actuaries tackle a task, the focus is often on the second-to-last step: producing results directly. However, there may not be enough time spent on the design and controls in the process as a whole, which can leave the process exposed to risks.

Things can go wrong right from the start. We may not get the correct data from the administration system,

ALTHOUGH MANY OF US ARE COMFORTABLE WITH THE WAY WE WORK NOW, WE MAY BE UNAWARE OF, OR NEGLECT, RISKS THAT EXIST IN OUR ACTUARIAL PROCESSES.

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causing us to waste precious time producing results with the wrong data. Even if the data we receive is correct, it could change after we import the raw data into actuarial software.

In our attempt to get the data into the right format before it is used in calculations, we might ruin the original dataset.

When one person is scripting in actuarial software to manipulate the data, the person may have tests to detect if the code can achieve what it intends to do, but there may be no reviews on the code itself. It may not be the simplest for what it does and could have taken much less time. He may also have to quickly move on to a new project without giving sufficient time to document his work. If that person leaves the company, his or her successor may struggle to understand it.

On the other hand, even when multiple members work on coding, if one member makes a change to the code, the change may take effect before anyone has a chance to review it because there is no explicit control to prevent anyone from modifying the code and there is no easy way for others to discover the change.

WHAT ARE THE POTENTIAL IMPROVEMENTS?

The items I've been discussing are just a small sample of the risks pertinent to our actuarial processes. Some of these risks may look minor and could be easily mitigated with simple but effective controls. However, with others we may need to spend more time on design and use different resources to help us.

In fact, if we look to other professionals, such as the IT department, we will be able to see a gap between an actuarial process and an IT process. More emphasis is placed on design and controls on the process for a software developer than for an actuary. For example, peer review for the code is a formal step in the process of a software developer. There may also be a platform that requires changes to be reviewed before being pushed into the

main system. Last but not least, there is more focus as a team on achieving a consistent style of coding.

Although the difference may be justified by the fact that the final products these two professionals deliver are different and that actuaries may not be able to fully implement the IT risk controls due to inherent restrictions in our systems, there are a few things that we can learn from the software developers to improve the quality of our own actuarial process.

The first two steps would be to review the current actuarial process and identify the weaknesses. With increased awareness and support from management, a formal best practice guideline can be created. This might include measures that could be implemented with current resources, such as standards to encourage consistent style in coding and spreadsheets, or allotting sufficient time for review. The guideline could also include other controls that may require more effort to implement, such as the control of changes made by each team member or a log that lists changes implemented into the model. If resources are available, research into more powerful tools and new platforms can be considered.

These are just a few ideas for improvements we can make to our actuarial process to make it more robust. It will certainly be worthwhile to analyze our processes more deeply and seek insights from other professions to further strengthen them. ☆

BOOK REVIEW:

Abundance by Steven Kotler, Peter H. Diamandis

Review by Dave Snell

We are the actuaries of the future, and as such, we have a special interest in the future. Most books and articles lately seem to be predicting gloom and doom: we will run out of fossil fuels (or energy in general); we'll run out of clean water; we'll run out of food; the earth cannot sustain our burgeoning population growth; diseases will run rampant; etc., ad nauseum.

So it was a real pleasure to read *Abundance*, a book that presents credible arguments that we are likely to have an abundance (hence the book title) of energy, clean water, food and good health.

The authors are not naïve Pollyanna types. Peter Diamandis is the founder of the X Prize, and that has sponsored some imposing challenges with incredible results. Previous X Prize challenges have resulted in privately sponsored sub orbital space travel, cars that get over 100 miles per gallon and synthetically created organisms to clean up oil spills. Steven Kotler is an award-winning science writer, and he and Diamandis collaborated on this excellent book.

The basic idea in *Abundance* is that technological advances emerge to solve problems of scarcity, and that the rate of these advances is proceeding at an ever-increasing pace.

The authors discuss historical shortages such as aluminum. Whoa! Did I just say aluminum? Yes, as it turns out, even though aluminum is the third-most abundant element in the earth's crust, it was very difficult to extract it from the bauxite clay in which it is naturally embedded. A technological breakthrough in 1886 caused aluminum to switch from one of the most expensive metals to one of the least expensive.

Progressively, they work through other shortages or predicted shortages and show how recent or emerging technology breakthroughs can turn these into similar success stories for humankind: turning salt water or even sew-

age to pure drinking water, vertically farming to save acreage and nutrients and eliminate the need for pesticides, growing beef from cells instead of raising and killing cattle (very wasteful and cruel—it takes 2,500 gallons of water to raise and deliver one pound of beef, and billions of animals are killed for food each year), harnessing the immense potential of the solar energy coming into our atmosphere each year—more than 5,000 times our current energy needs.

A driving force behind these advances is not the governments of the world, which the authors feel are hampered by bureaucracy and inertia, but by a new breed of technophilanthropists who make their fortunes at a much younger age and then decide to use their money and expertise to change the world for the better. Bill Gates is making progress fighting diseases such as malaria. Greg Ventnor is providing affordable genome analysis, and others are contributing in similar ways that were unimaginable just a decade or two ago.

They cite the explosive growth of cellular phone usage in Africa and state that a Masai warrior with a smartphone now has better access to information than that available to the President of the United States just 15 years ago. Another reason I liked this book so much was the extensive research references. This is not the type of book where the author quotes an ambiguous research study, or even worse, justifies his statement by a quote from



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another one of his own books or a tabloid headline. All of the references were amply described and many of them had links to websites for further information. This is a book where I recommend the Kindle version over the print one to more easily navigate from the text to the references.

Abundance is a welcome read, and an inspiration for all of us. It shows that a single person, thinking more creatively, can make a big difference in helping to solve problems difficult for entire countries. We are each responsible for the future. Let's make it one of Abundance! ☆

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What We Talk about When We Talk about Actuaries

By Vanessa Shuang Wu



Vanessa Shuang Wu is a senior at Smith College majoring in Math and obtaining a minor in Studio Arts, graduating in 2013 May. She can be reached at vanessa.shwu@gmail.com.

One Friday morning, in the elevator—I was leaving my apartment for work, not expecting anything surprising to happen. The elevator stopped on the 20th floor, two floors below mine. Here came a man, carrying something strongly familiar under his arm. As if the weight of that object was beyond his strength, he put it down on the ground after he entered.

“Are you also taking MFE?” I ventured to ask.

“... Yes.” There was a one-second hesitation before his response.

“Me too.” Life has taught me to carry on talking without being asked to.

“Oh really?” He looked at me, as if I was making it up, “When are you taking it?”

“August 7. And you?” Do I look more convincing now?

“Is that the last the day of the August sitting?” (You don’t even remember your EXAM day? And what do you consider yourself to be?) “Then me too.”

On the outside, I looked calm and composed, even though inside I was racing and shouting “This is not real!” a million times.

Seriously, what’s the chance of one actuarial student running into another? Living in the same building? Taking the exam on the same day?

For years I was the Lonesome George in my liberal arts college, studying for exam after exam on my own, having no one to confer with. Even one of my best friends often fails to follow me when I complain to her how stressed I am because of, say, FM.

“Didn’t you already take it last summer, honey?”

“No, mum. That was P last summer.”

“Oh, so this is a different one.”

“I wish they were the same.”

But my whole perspective changed this summer. I got an internship in a consulting firm and moved to a place where you can’t throw a pie without hitting an actuary in the street—Hartford, Conn. The Lonesome George is finally sent to a zoo, surrounded by friendly and welcoming faces that understand what I am talking about.

Here in this environment I meet people who calculate the expectation when playing Liars’ Dice, people who will trade “insurance” to other players in Settlers of Catan, people who not only greet you with the usual (while misleading) “what’s up?” but with “how’s the exam study? Peer pressure to study comes as a pleasant companionship, which is a feeling I never expected to have. One day I left my BA II Plus at home (usually I call it “my calculator” since the real name makes no sense to my friends, but here comes the benefit of having insiders as readers). Two month ago, this was an uncorrectable mistake, but without trying too hard to look around, I got a substitute from a co-worker.



As if the actuarial cultural shock wasn't enough, I have two roommates who are actuarial students from another company, and I know at least three others in my building, plus the elevator guy I mentioned at the beginning of this article. Two weeks ago, I had a lovely dinner with at least eight actuarial students from a third company! Just when I felt that I must have known half of the actuaries and rising actuaries on this side of the sphere, the rare species suddenly starts to emerge and populate. I run into more of them day by day, in those most expected places such as UConn library, the very deep end at Starbuck's, as well as those unexpected occasions, including the very fancy restaurants in the West Hartford center, or the laundry room where I live (wow, actuaries do their own laundry?). Even though they don't possess any unique facial features, they are not hard to distinguish at all.

You can always tell an actuary by the brick-like manual they carry and cherish with abundant notes and plenty of highlights. And they often have more than one item that defines who they are and where they come from: for example, a T-shirt with the company's logo, an umbrella of the company's signature colour, or a mug that proudly brags its owner. Overwhelmed by the buy-one-get-one-free phenomenon, I finally start to understand what Newton means in one of his famous quotes:

"I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

I realize that the place where I am deserves to be compared with something much bigger than a zoo. Perhaps an ocean? After hours of brainstorming, I propose a slogan to be put at the entrance of this city. It should probably be something like this:

Welcome to Hartford—the insurance companies' jungle, where you can find one of the most rare species of the world in dozens—actuarial candidates.

I would love to take this opportunity to give thanks to Landon Sullivan, Jenica Kessler, Shelley Davidson, Jeff Bowers, Mike Cesaro, Veronica Skinner, Sergey Tsilensko, Delyan Georgiev, David Wall, and many others, for their heroic kindness and support this summer - without you, this dream would not be real for me. I'd especially like to acknowledge Yutong Qin, the summer angel of my life, whose laughter would penetrate the heavy doors of the elevator even though we were not on the same floor. ☆

It's a Challenging Job Market – How to Go the Extra Mile

By Ricardo E. Obasare



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There's just not enough time! – That seems to be the consensus of college students trying to balance the pressures of a normal academic workload and extracurricular activities while having time to enjoy the college experience. When senior year rolls around there is the added pressure of finding a job, and not just any job but a job that will allow you to progress and satisfy your professional goals. Having gone to many career fairs, I learned early on that employers look for three main things on a resume: proof of academic aptitude, extracurricular involvement and leadership, and finally work experience. For the actuarial student there's the added pressure of having to pass one or two actuarial exams, but for the most part this is a standard checklist for employers. With so much economic uncertainty and student loans, students find themselves scrambling to get any job to pay the bills. Many students get so caught up in “beefing up” their resume they place little attention, if any, on one of the most important aspects of the job

search—networking. There is a common misconception by students that networking is solely a means to an end, the end being getting that desired job. However, networking is a life habit; it's the act of connecting yourself with a support system to help guide you, and when used efficiently, can go a long way in helping you to accomplish your life goals.

Networking provides a great deal of exposure to the different jobs out there and the opportunity to meet a wide range of people. With networking it's not just about a name, it's about getting to know someone on a personal level and learning more about what drives them to do what they do. In the process you start to learn about more about the things that interest you and the platforms available to you. As an actuarial student at a university where engineering predominates, there were limited opportunities to meet working actuaries, as most of the companies on campus were recruiting engineers.

Networking, therefore, became a useful tool for me to get as much information on the actuarial field and the type of problems that actuaries deal with.

One thing I learned very quickly is that if you ask someone who's gone ahead for help, more than likely they'll be willing to offer advice as best they can. I remember going to an alumni panel comprised of engineers and thinking "I doubt there will be any relevant information for actuarial students," but I went anyway. Surprisingly, when I mentioned in passing that my major was actuarial science, one of the alumni said a close friend of his was an actuary and would be more than willing to talk to me. Often your contacts, even if they can't help you themselves, can connect you with someone who can.

I find alumni in particular are very helpful because they are rooting for you to do well and will try their best to assist because they've been in the same position. In my junior year I had a hard time finding an internship. With one exam and one internship completed, I thought I was a viable candidate. As luck would have it, another student told me about an opening at his company and asked me to submit my resume. Because of this connection, I was able to get an internship and ended up returning to the company full time. With the economy as it is, many companies have cut down on the number of interns that they take making it more competitive for students seeking internships. Sometimes it's not a matter of having all the right qualifications but rather knowing the right people and taking advantage of your connections. Having a set of people who understand your skill set and what you bring to the table goes a long way in helping you get ahead in the job market.

With that, I'd like to share three simple tips that I think will give students an edge in the job hunting process.

Be Proactive – Seek out opportunities to network, and more often than not, there are many available. In college the easiest way is through alumni. Most career centers have a list of alumni in your field that you can connect

OFTEN YOUR CONTACTS, EVEN IF THEY CAN'T HELP YOU THEMSELVES, CAN CONNECT YOU WITH SOMEONE WHO CAN.

with. Another good way to connect with other alumni is through involvement in certain clubs on campus. Professors are also a good resource and have a wealth of information about specific fields and taking the right career path. These days social media is another avenue. You can connect with people on LinkedIn (don't just add people to your friends list). I encourage you to actually talk to them and learn more about what they do. Just going the extra mile and asking a question can lead you to discover career possibilities that you may not have thought of. Don't expect opportunities to come knocking on your door if you aren't willing to spend time to seek them out.

Be Honest – Understanding what you want in a career can go a long way in finding the right people who can help you get to that place. What do you value most in a career? Does it need to be fast-paced and challenging? Do you want to travel often? Do you prefer a large corporation or a smaller startup? Too often I find that people don't take the time to think about what they would enjoy doing professionally. I think there's a tendency to view working as a way to pay bills rather than a meaningful engagement. It's important to spend time thinking about your ideal job and recognizing the positives as well as the negatives that come along with that. For example, traveling often may be a great way to meet people, but it can also be exhausting after a while. Spending some time thinking honestly about the ideal job can help you decide what career path is right for you and prevent you from taking jobs that may limit your progression.

Keep Track – Keep a list of contacts that you've met and how you met them. Maintain the relationship and send a message to check in from time to time. Remember these are people you want to develop a relationship with and feel comfortable asking for advice. Don't wait to contact

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someone in your network when you have an immediate need. It is important to touch base with them periodically to let them know what's going on in your life and vice versa. This way you develop a diverse base of contacts that will be able to provide different perspectives and advice.

It's never too late to start developing and strengthening relationships with people who are vested in your success. Understanding the importance of networking is the first step toward achieving a fulfilling and rewarding professional career and personal life. ☆



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Longevity Risk Solutions: Coming to the USA Soon!

By Efreem L. Epstein

In 1960, the life expectancy at birth in the United States was 69.8. By 2010, it had increased to 78.2 with some futurists predicting the number to rise even faster in the decades to come. Obviously, this is good news on many levels, but the silver cloud is not without its lining. On the personal level, as life expectancy increases, so does the chance of outliving one's savings, a phenomenon that is often referred to as "longevity risk." On the corporate level, longevity risk is of strong interest and concern to the administrators and providers of defined benefit pension plans as they may now be paying out benefits to their recipients for a significantly longer period than was originally expected. While many in Europe have been strategizing in this area for some time, the threat of longevity risk is just beginning to be recognized in North America. It was in this vein that roughly 70 attendees converged on the afternoon of March 22, 2012 to a seminar on longevity risk sponsored by the Actuarial Society of New York (ASNY).

Mattias Eng and Peter Nowell from BNP Paribas, London were the guest presenters and drew on their expertise and experience in illustrating the latest global trends for the audience. The Solvency II directive has forced the hand of European companies and they are now designing and implementing solutions to ensure EU compliance ahead of the Jan. 1, 2014 deadline. Certain countries such as Denmark and the Netherlands have been more in front of the problem than others.

In short, there are three common ways to hedge longevity risk. The first is a longevity swap where Party A transfers a large amount of its longevity risk to Party B. In exchange for a risk premium, Party B pays the differences in liability cash flows to Party A (which can be positive or negative) between the expected and actual payments. The second is an interest rate swap where Party A can pay a premium to Party B to ensure a fixed interest rate with Party B assuming the floating rate. The third manner, which borrows elements from the previous two, is the balance guarantee swap. The balance guarantee swap reduces volatility by continuously adjusting the notional amortization to insure the matching of assets



and liabilities. Eng and Nowell believed that different solutions are appropriate for different institutions dependent on their appetite for risk retention and ability to meet the cost of the risk transfer. A large number of solutions to date have emphasized an all-out transfer of *all* longevity risk associated (primarily) with pensions in payment liabilities, whereas it might be more appropriate for institutions to retain some longevity risk to reduce costs, hedge complexity, and transaction maturity, and thus counterparty risk.

Howard Zail, FSA, a partner at specialist longevity actuarial advisor Elucidor, LLC, was one of the attendees at the seminar and later noted that America may be catching up faster than people realize. Earlier this summer, Prudential Financial and General Motors broke a new barrier in the American market when the former acquired a portion of the latter's pension obligations for \$29 bil-



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AS THE VOLATILITY OF LONGEVITY INCREASES, MORE AND MORE COMPANIES ARE GOING TO NEED TO FIND SOLUTIONS TO HEDGE THEIR RISKS.

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lion. "This could be just the tip of the iceberg," noted Zail, "As the volatility of longevity increases, more and more companies are going to need to find solutions to hedge their risks. Some will opt for the example set by General Motors, but others may seek alternative solutions that better suit their needs."

Society may view longevity risk as a good problem to have, however even the best of problems still require

solutions. Some companies may pursue balance guarantee swaps as recommended by the aforementioned presenters. Others may look to the General Motors-Prudential deal as their blueprint. Individuals looking to hedge longevity risk will face their own challenges in the years to come and will need to be catered to as well. If trends from Europe are any indication, longevity risk is likely to be an issue of increased importance on domestic and international fronts in the years to come. ☆



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Substitute One Mis-impression

By Hezhong (Mark) Ma and Dave Snell

The long-standing motto of the Society of Actuaries, from John Ruskin, is “The work of science is to substitute facts for appearances and demonstrations for impressions.” We have always had the IMPRESSION that it means our job, as actuarial scientists, is to pursue facts, and facts only. But this time, we decided to substitute our impressions with demonstrations. Mark Googled the quote.

The quote is from Mr. John Ruskin’s book, *The Stone of Venice*, Volume 3, page 36. The book is about Venice’s architecture. But Mr. Ruskin, as a good actuary, went on commenting on something broader, the relationship between art and science in his term. Here is the context of the quote:

VIII. Science and art are commonly distinguished by the nature of their actions; the one as knowing, the other as changing, producing, or creating. But there is a still more important distinction in the nature of the things they deal with. Science deals exclusively with things as they are in themselves; and art exclusively with things as they affect the human senses and human soul.* Her work is to portray the appearance of things, and to deepen the natural impressions which they produce upon living creatures. The work of science is to substitute facts for appearances, and demonstrations for impressions. Both, observe, are equally concerned with truth; the one with truth of aspect, the other with truth of essence. Art does not represent things falsely, but truly as they appear to mankind. Science studies the relations of things to each other: but art studies only their relations to man; and it requires of everything which is submitted to it imperatively this, and only this, what that thing is to the human eyes and human heart, what it has to say to men, and what it can become to them: a field of question just as much vaster than that of science, as the soul is larger than the material creation.

* Or, more briefly, science has to do with facts, art with phenomena. To science, phenomena are of use only as they lead to facts; and to art facts are of use

only as they lead to phenomena. I use the word “art” here with reference to the fine art only, for the lower arts of mechanical production I should reserve the word “manufacture.”

Mr. Ruskin’s definitions of art and science are different from what most people would think about today. Mr. Ruskin, as part of his religious belief, believed that truth is static and universal—a bit mysterious, but there waiting for us to discover. Starting from this belief, he drew a line between art and science. Many branches of modern philosophy of science would argue otherwise.

However, none of those ideas is as surprising to me as how much I misread the quote. Before, I thought Mr. Ruskin must loathe appearance and impression. I reasoned that they are subjective, volatile, unreliable and therefore unscientific. We have to substitute them with something objective, concrete and “scientific.” Obviously, as an art historian, Mr. Ruskin had no interest to down-play “art.” Actually, he even rated art higher than science. To Mr. Ruskin, the truth already exists, and produces influence over us, over our souls. The work of science is to express this influence with facts, to substantiate the impression, not to dispute or fight against. To some extent, he was calling appearance and impressions prophets for science. In Ruskin’s time, over a century ago, we thought that facts were far more important than impressions. Yet now, we realize that perception is often more important than reality. In fact, the burgeoning science of behavioral economics is focused on exactly that issue.

The well-known example of *The Economist* magazine pricing (from Dan Ariely’s book, *Predictably Irrational*) is one notable example:

When given the choice between two subscription arrangements, the online version for \$59 and the print plus online version for \$125, over 2/3 of a group of MIT students chose the \$59 online version. Yet, when



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a print-only version for \$125 was added to the mix of choices, a similar group overwhelmingly (over 85 percent) chose the \$125 print plus online version. The clear facts were that the print plus online version still cost \$66 more than the online version, but the inclusion of an obviously less attractive option made it seem so much more attractive.

Every day we make similar choices based on impressions rather than facts. We might drive an extra mile to purchase the gasoline at \$.05 less per gallon (for a total savings under a dollar), but we might not consider that long a trip to save \$10 on a \$500 television set.

WE MIGHT DRIVE AN EXTRA MILE TO PURCHASE THE GASOLINE AT \$.05 LESS PER GALLON (FOR A TOTAL SAVINGS UNDER A DOLLAR), BUT WE MIGHT NOT CONSIDER THAT LONG A TRIP TO SAVE \$10 ON A \$500 TELEVISION SET.

We will spend hours to come up with a few more deductions for our tax return, yet expend little more than water cooler conversation time deciding which candidate to vote for that might prevent another trillion-dollar war expense.

Several years ago, most life insurance companies in the United States were headed by actuaries. Now, we are becoming a minority in the corporate suite, as other quants (MBAs, CFAs, CIAs and a host of other As), with perhaps more training in the soft skills of perception and networking are rising to positions of more prominence in senior management. Did we misunderstand Mr. Ruskin to our detriment?

We have studied long and hard to become experts on the operational risks associated with life insurance. On the liabilities side, these include the obvious 'big three' study note topics of mortality, interest and expenses. Our models do an excellent job of quantifying these types of risks. Stuart Greenbaum, Dean Emeritus of the Washington

University School of Business, looks at the risks that can threaten the very existence of a company, risks that go beyond operational risks—existential risks.

Decades ago, as part of General American Life Insurance Company, we saw a \$30 billion company go into receivership because it did not have the foresight to develop a mitigation strategy for an existential risk outside of its actuarial models. The risk was that of a ratings downgrade. Moody's, a major ratings service, dropped the rating on General American Life by one point. The result was that their rating crossed a threshold and forced the pension fund managers who held GICs (Guaranteed Investment Contracts) from General American to divest and ask for their money back. The GICs had a seven-day provision to return the money. Since the company could not liquidate enough assets to raise \$6 billion in seven days, it was forced to default and thus was taken over by the state insurance regulators.

If the actuaries at General American had been able to anticipate the warning signs of this existential risk—even by a few weeks—they may have sold off other assets in order to raise the requisite cash. They may have secured letters of credit to cover the potential crisis. They may have sold off some of this business to other companies ... perhaps to your company! At that time, this was still profitable business. That was not the issue. Could your company raise 20 percent of its assets in seven days?

One might argue that since the GICs were a minority of the business, that General American was vulnerable to impressions (a rating downgrade) disproportionate to the facts of the situation. Quantitative models might or might not be adequate to project existential risks or things like impressions.

Mr. Ruskin prophetically considered the soft skills of art at least as important as the 'hard facts' of science. Impression, in his term, is not superficial feeling. Appearance is not passing shadow. In today's business environment, they are more properly called big picture,



business insight, executive judgment, gut feeling. Did this 100-year-old motto hound us so much so that we are busy in crunching data, building more and more complex models to substitute demonstrations for impressions? Following the spirit of the quote, actuaries have built a reputation of being thorough, reliable and knowledgeable. On the flip side, this reputation also depicts a rigid, boring, tunnel-minded actuary. Is it time to move forward, making sense of the piles of numbers we generated, leaving an impression by communicating facts? In other words, is it time for us to substitute appearances for facts and impressions for demonstrations?

We both earned diplomas from the SOA. Perhaps we both had a very wrong impression of the quote printed at the bottom. Which interpretation was perception, and which was reality?

You can find different formats of Mr. John Ruskin's book, *The Stone of Venice* at <http://www.archive.org/details/stonesofvenice03ruskuoft>.

Or you can read it online via Google Books. ☆

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