SOCIETY OF ACTUARIES Reinsurance Section

Reinsurance news

1 Life Reinsurance—A Time of Increasing Relevance
By Mark Prichard

3 Chairperson's Corner
By Mike Mulcahy

9 Mis-Estimation of Risk
By Stephen Richards

13 Actuarial Behavior Risk
By Timothy Paris

17 Regulatory Update
By Jeremy Starr

22 Artuaries—Where Art Meets Actuarial Science
By Ronald Poon-Affat

24 LEARN Update
By John Cathart

25 From the Archives (1985): When The Battle Lines Are Drawn
By Bob DeMarco

27 Why The Financial Crisis Inspired An Actuary To Be An Author.
By John Gordon

Issue 81 | March 2015

Life Reinsurance—A Time of Increasing Relevance

By Mark Prichard

Over the last five years, companies active in the life and health reinsurance segments have experienced challenging conditions globally.

Reinsurers have faced growth challenges in the largest individual segments:

- The individual mortality market in the United States is the world's largest. Since 2008, U.S. insurers have ceded reducing levels of face amount, opting instead for higher attachment points. In-force reinsurance face amount peaked in 2011. Given also the long-term transition from co-insurance to YRT structures, ceded premiums in respect of new business have fallen even more sharply.

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Reinsurance news

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Issue 81 | March 2015

Call for Articles for next issue of Reinsurance News.

While all articles are welcome, we would especially like to receive articles on topics that would be of particular interest to Reinsurance Section members.

Please e-mail your articles to Richard Jennings (*richardcjennings@gmail.com*) or Ronald Poon-Affat (*rpoonaffat@rgare.com*).

Some articles may be edited or reduced in length for publication purposes.

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Chairperson's Corner

By Mike Mulcahy

Mike Mulcahy, FSA, MAAA, is vice president, Marketing with Canada Life Reinsurance in Blue Bell, PA. Mike can be reached at mike.mulcahy@lrgus.com.

Chairperson's Corner By Mike Mulcahy

I never cease to be amazed by the seemingly endless acceleration of the passage of time. It feels to me like yesterday I attended my first Reinsurance Section Council Meeting. Yet as I write this, the last of my three years on the council is already more than one-third of the way complete (section council terms start with the SOA Annual meeting in October).

As this issue goes to print, many of us will be gathered in Vegas for ReFocus 2015, the now traditional kick-off to the reinsurance year. And before we know what happened, we will be scrambling to get those year-end transactions closed before the holidays.

So before the year passes by, here is a quick overview of what the Reinsurance Section Council has planned for 2015:

- More than 10 sessions on reinsurance are scheduled between the Life & Annuity (L&A) Symposium, the Health Meeting, and the Annual Meeting.
- After the success of intensive reinsurance seminars the last two years, another introduction to reinsurance seminar is planned to follow the L&A Symposium in May (thanks to Mike Kaster for the planning).
- Look for at least four webinars this year on topics including offshore reinsurance, simplified underwriting, and in-force management.
- The LEARN program continues to provide reinsurance education to state regulators, with four states already lined up to receive presentations this year.
- We are looking to fund research projects on Predictive Analytics and Retention Management.

And a final note on how quickly time goes by. Richard Jennings has now been the editor of Reinsurance News for 10 years. At the 2014 SOA Annual Meeting the Reinsurance Section Council presented Richard with a plaque to commemorate the work Richard has done. Reinsurance News is the voice of the Reinsurance Section, so on behalf of the Council and the entire section, a giant, "thank you," to you Richard!

CONTINUED ON **PAGE 4**

SOA EXPLORER TOOL

Find fellow actuaries around the block or around the globe

The newly-created SOA Explorer is a global map showing you where SOA members, their employers and actuarial universities are located.

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To use the SOA Explorer Tool, visit ***soa.org*** and sign in as a member.

- In the United Kingdom and Ireland, the world's second largest reinsurance market for individual business, cession rates remain as high as reinsurers will permit (~90 percent). Risk amounts ceded have also remained broadly stable. The underlying primary protection market has however been impacted by the financial crisis of 2009, and also new regulation (in the form of the Retail Distribution Review) which has significantly impacted sales volumes through certain channels (such as bank financial planning). Reinsurance new premiums have also fallen significantly due to regular tendering, which has produced consistently lower pricing. Similar to their U.S. counterparts, U.K. insurers have steadily replaced level premium reinsurance structures with YRT arrangements.

- Generally attractive levels of growth in emerging markets (Asia is now producing more life reinsurance new business than the United States or the United Kingdom), as well as robust growth in some group segments, have been unable to offset the impact of reduced flows from the largest markets.

Fierce competition on pricing and other commercial terms in the largest segments over the past decade has manifested in reinsurers needing to apply significant reserve strengthening over the past three years:

- "Early-2000" blocks of individual mortality business in the United States have proved either "low margin" or significantly loss-making, with reported losses in the order of US$1 billion.

- The sum of announcements in respect of "reserve strengthening" in the Australian market reached c. US$2 billion, primarily stemming from the group segment (across all risk classes, although most acute for total and permanent disability (TPD)). There were also meaningful contributions from the individual segment where income protection business produced actual termination rates far lower than any insurer or reinsurer had priced or provisioned for.

- Reinsurers are generally concerned about the level of individual rates in the United Kingdom, particularly for critical illness (one-third of ceded risks by premium), but also mortality (where rate differentials are largely premised on differing views of the rate of future longevity improvements).

The scale of these losses is significant by any measure. The combination of these effects, and a period of low investment yields following the global financial crisis, has seen RoEs fall sharply for the life and health reinsurance segment. Reinsurers have also seen operational (i.e., maintenance) expenses rise as a percentage of pre-

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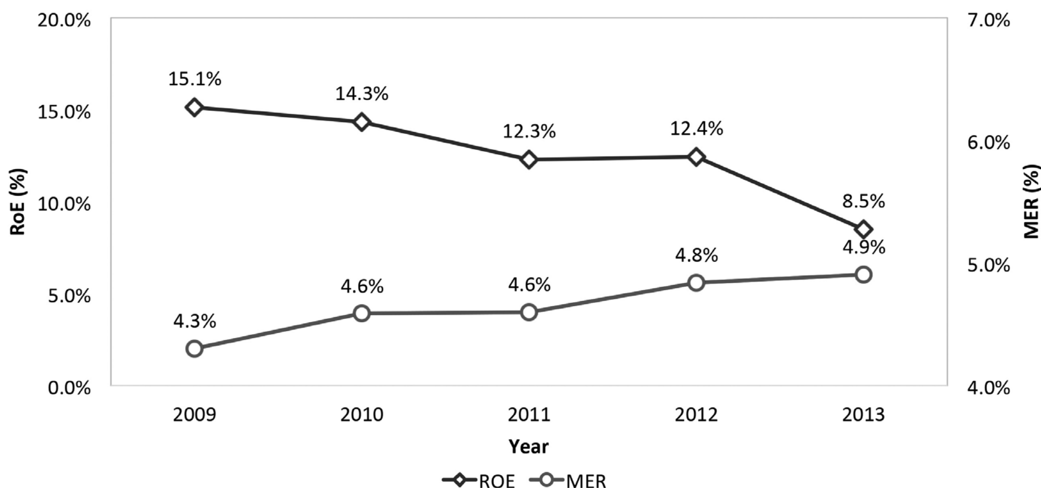
Figure 1: "Global Six" life and health reinsurers' profits, return and expense ratio (2009 – 2013)



Notes: Top six includes Swiss Re, RGA, Munich Re, Gen Re, Hannover Re, SCOR; Profits shown are before tax; ROE is calculated as a ratio of profits before tax to average net assets; Expense ratio (MER) is calculated as management expenses to net earned premiums

Source: Company accounts, analyst reports

miums over the past five years, although while there are significant differences between competitors, the average MER still lies in a reasonable range

For a number of different reasons, these headwinds have not necessarily been reflected in reinsurance company share price movements, which have seen share prices increase by ~30 percent over the same five years. Reinsurers still trade at relatively low price-to-earnings ratios compared to other sectors, however.

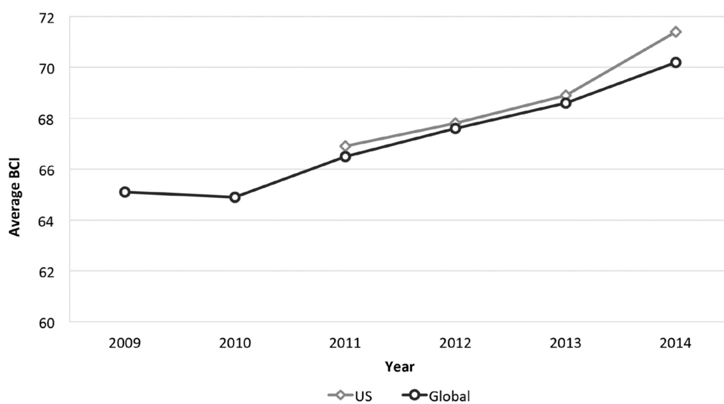
Despite this period of transformation, and unlike the underlying life insurance industry in many markets (where the focus is largely on savings and investments), the proposition of life and health reinsurance is not fighting a battle for relevance. Indeed, it is my personal view that life reinsurers are becoming ever more relevant to life insurers.

This hypothesis is underpinned by three key ideas.

1.LIFE REINSURERS ARE INCREASINGLY CAPABLE

With margins and volumes under attack, life reinsurers have not sat idle. Acquisitions have allowed smaller reinsurers within the "Global Six" to achieve further scale. Reinsurers have also diversified their businesses into new segments including living benefits and longevity risks, and globalized their capital solutions capabilities.

Figure 2: Business Capability Index (BCI) – Client Satisfaction (2009 – 2014)



Source: NMG Global Life & Health Reinsurance Program.

Investments have also been channelled into client-facing teams, as well as new capabilities and technologies.

These efforts and investments have been recognized in greater satisfaction ratings from direct insurers around the world (measured in NMG analytics in the form of a Business Capability Index (BCI)).

Perhaps of greatest strategic relevance is the fact that reinsurers have developed a more expansive view of their ability to deploy their capabilities and solutions across the value chain. This expands significantly the opportunity set for reinsurers, creating avenues for reinsurers to have a direct hand in the development of the underlying life protection markets in many countries around the world.

2. PRIMARY DISTRIBUTION SYSTEMS ARE EVOLVING

Particularly in Anglo-Saxon markets, direct channels have enjoyed significant increases in market share of the sales of new protection products. In Australia, where almost 90 percent of personal lines sales for motor and home insurance are via direct channels, and where life protection products are sold on a stand-alone basis, the proportion of life and health insurance new sales sold through direct channels has lifted by nearly 20 percent over the past five years. The United Kingdom and South African markets have also seen significant lifts. In addition, in NMG's multi-country study of consumer buyer preferences, non-advice purchasing intentions suggest significant further shifts in favor of direct channels. Our study of customers in the United States suggested similar trends, albeit from a lower starting point.

Challenged by static life insurance customer bases in a growing population, life insurers in America recognize that existing distribution channels have been unable to meet the needs of some sizeable customer segments (typically younger persons, and/or those without a significant need for asset protection).

NMG's 2014 life reinsurance study of the individual mortality segment in the United States, in which we interviewed 125 insurance executives, indicated the degree to which life insurers are mobilizing behind

finding solutions to address these under-serviced and under-insured segments.

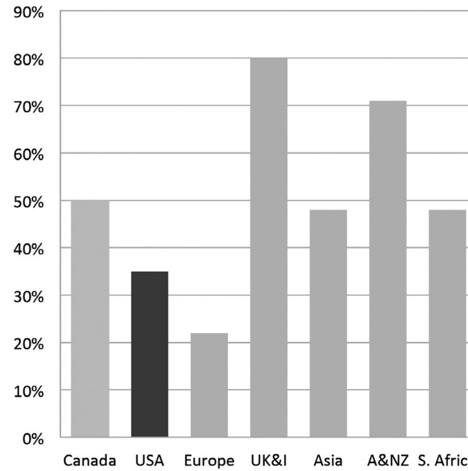
Approximately 80 percent of insurers considered the "under-insured" segments a central component of their distribution strategy, and more than half of companies indicated that they had already launched initiatives focused on these segments. The majority of these programs are pilot studies and relatively small scale, and hence still of limited immediate commercial relevance to insurers that have implemented them. Nevertheless, their significance cannot be underplayed in a market where currently sales of life protection via direct channels significantly lag that of peer markets.

New channels, and new distribution processes focused on the sale of stand-alone direct products are good news for reinsurers, since nearly 90 percent of insurance executives consider reinsurers as logical partners with which to explore and exploit the opportunities of these underserved customer segments.

3. REINSURERS HAVE ACTIVELY INVESTED IN TECHNOLOGY

A key enabler of direct channels is an automated underwriting solution focused on streamlining and simplifying the new business acquisition process. For the past decade, reinsurers have actively invested in the automation of the underwriting process; collectively reinsurers have more than 100 installations globally, and are well-positioned to support insurers in these new endeavours.

Figure 4: Proportion of Insurers with meaningful AUS investments or plans



Source: NMG Global Life & Health Reinsurance Program, 2014.

U.S. insurers are relative latecomers in terms of the adoption and implementation of automated systems, both for direct channels and in the support of advised channels. This is significant as the potential applications of automation, and the linkage to new "selection assets" (such as pharmacy prescription databases, and new risk scoring algorithms produced by some vendors, together with MIB, and Motor vehicle record data and a host of other "big data" opportunities) are greater in the United States than any other market globally.

As opposed to the technology itself, U.S. insurers see greatest value in the underwriting algorithms, which underpin the decision logic.

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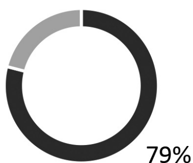
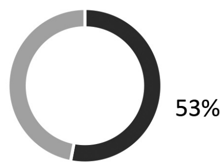
Figure 3: Insurance decision makers' views on the role and relevance of reinsurance (US, 2014)

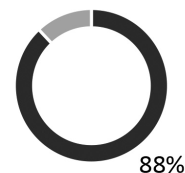
3A: Insurers that consider under-insured segments a key component of their distribution strategy



3B: Insurers that have already launched a proposition for the under-insured segment



3C: Insurers viewing reinsurers as significant partners in accessing new growth segments



Source: NMG U.S. Individual Mortality Reinsurance Program, 2014

Mark Prichard is CEO, NMG Consulting based in London, U.K. Mark can be reached at mark.prichard@NMG-Group.com

U.S. insurers may well close the gap to comparable markets within just 18 months, with probably 15 reinsurer-supported automated underwriting systems expected to commence implementation in the next 12 months. The U.S. market has become the hotspot for automation implementations globally.

A key challenge facing insurers in respect of these new channels and segments, lies in how best to leverage these new selection assets. More specifically, how can insurers enable underwriting and acceptance at competitive rates (presumably with a whole new set of preferred thresholds), without recourse to the expensive, invasive and time consuming information insurers have come to rely upon. Insurers face the prospect of a brave new world of underwriting without bodily fluids!

THE ROAD AHEAD

Having endured a particularly difficult period since 2009, the life reinsurance industry still meets muster in terms of its relevance to insurers. While the operating environment will continue to be challenging, reinsurers can now see clear opportunities ahead in helping to create new distribution channels, reducing redundancy in existing adjacent channels, all while helping to reshape the new business process and even the underlying philosophy of underwriting. In no market will this be more impactful than the U.S. individual mortality market.

But opportunities extend beyond new distribution and automation. Globally, capital solutions are set to have particularly high relevance in Continental Europe as well as several Asian markets. And emerging markets, which account for relatively small markets currently, will continue to grow in relevance.

Profitability concerns for certain segments will continue to capture significant bandwidth of reinsurance executives, but with a few exceptions, the scale of these effects is mostly understood, and "green shoots" of profitability may return quickly to some of the more problematic segments.

Reinsurers are increasingly circumspect about the attractiveness of current rate levels in the United Kingdom and Irish markets, and the cycle of relentlessly decreasing rates seems at last to have come to an end, as market incumbents have limited appetite for additional shares.

Reinsurance competitors are better organized than five years ago to adapt to these challenges, and have sufficiently distinct strategies not to pursue these opportunities uniformly. It would be hard to imagine, however, that any mainstream reinsurer would not include an automated underwriting proposition within its broader offer in the years ahead. ■

Mis-Estimation Risk

By Stephen Richards

Actuaries often have to derive a mortality basis from the experience data of a portfolio. The most common application is for risk management, such as the annual valuation. However, it is also required for pricing block transfers, such as longevity swaps, reinsurance treaties and bulk annuities. In each case it is useful to know two things: (i) what uncertainty surrounds the mortality basis, and (ii) what financial impact that uncertainty has. Both of these questions come under the heading of mis-estimation risk, which is the subject of this article.

EXAMPLE SCENARIO

A U.K. pension scheme is considering a longevity swap. The scheme and insurer have agreed a basis for future mortality improvements, but both parties have to decide on a basis for current mortality rates. Furthermore, both parties want to understand the mis-estimation risk surrounding the basis, and thus the potential financial impact. The scheme has n=14,802 living pensioners and also has 2,265 records for past deaths observed over the period 2007–2012.

The two parties have slightly different rationales in wanting to understand the mis-estimation risk. The scheme wants to know the financial impact to judge if it is worth paying the insurer's premium to remove the risk. In contrast, the insurer wants to know if its pricing margin covers the risk of mis-estimation based on the scheme's recent experience. In particular, the insurer (or reinsurer) will have to hold regulatory capital for mis-estimation risk if the longevity swap is agreed.

A full assessment of a longevity swap will require other work, such as an assessment of the idiosyncratic risk through the simulation of the lifetimes of the individual lives. Such simulations presuppose that we know what the underlying risk factors are for each individual. However, we do not in fact know these risk factors precisely, as we can only estimate based on limited data. The mis-estimation assessment puts a financial value on this uncertainty.

MODELING CURRENT MORTALITY

There are many ways to analyze mortality, but one of the better approaches is to use survival models for individual lives. This involves a parametric model for the force of mortality, which makes the best use of all available information. The model fitted here is the time-varying version of the Makeham-Perks law:

$$\mu_{x,y} = \frac{e^{\epsilon} + e^{\alpha+\beta x+\delta(y-2000)}}{1 + e^{\alpha+\beta x+\delta(y-2000)}}$$

where $\mu_{x,y}$ is the force of mortality at age x and calendar time y. The offset of -2000 to the calendar time keeps the other parameters well scaled. Parameters α, β, δ, and ϵ are estimated by the method of maximum likelihood. At a very simple level we can allow for the fact that not all individuals are identical by giving each person their own personal value of α, α_i, defined as follows:

$$\begin{aligned}\alpha_i = \alpha_0 & \\ & + \alpha_{\text{Male}} z_{i,\text{Male}} \\ & + \alpha_{\text{Mid-size pension}} z_{i,\text{Mid-size pension}} \\ & + \alpha_{\text{Large pension}} z_{i,\text{Large pension}}\end{aligned}$$

where, for example, α_{Male} is the change in mortality from being male and $z_{i,\text{Male}}$ is an indicator variable taking the value 1 when life i is male and 0 otherwise. The other parameters and indicator variables are defined similarly. The model is fitted to the scheme's data and the resulting parameter estimates are shown in Table 1.

Table 1. Parameter estimates for minimally acceptable model for financial purposes.
Source: Richards (2014).

Parameter	Estimate	Standard error	Significance
Age (ß)	0.148	0.005	***
Gender.M (α_{Male})	0.479	0.060	***
Intercept (α_0)	-14.731	0.491	***
Makeham (ϵ)	-5.420	0.154	***
Mid-size pension (α Mid-size pension)	-0.180	0.078	*
Large pension (α Large pension)	-0.313	0.108	**
Time (δ)	-0.046	0.016	**

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Stephen Richards, BSc, FFA, Ph.D., is managing director, Longevitas Ltd. He can be contacted at stephen@longevitas.co.uk.

CORRELATIONS AND CONCENTRATION OF RISK

The parameter estimates in Table 1 are shown with their standard errors. In a sense these standard errors are the beginning of understanding mis-estimation, as they tell us the degree of confidence we can have in each parameter estimate. For example, the estimate of the age parameter is 0.148 and an approximate 95 percent confidence interval for the true underlying value is (0.138, 0.158). At a superficial level, therefore, one might think that the standard errors are all we would need to assess mis-estimation. However, with all statistical models there are usually correlations between the parameters. Some of these correlations can be quite material, as shown in Table 2, and they must be taken into account when assessing mis-estimation risk.

Table 2. Percentage correlations between the estimates in Table 1. Source: Richards (2014).

Parameter	Age	Gender.M	Intercept	Makeham	Mid-size pension	Large pension	Time
Age (ß)	100%						
Gender.M (α_{Male})	23%	100%					
Intercept α_0	-94%	-26%	100%				
Makeham ϵ	72%	17%	-70%	100%			
Mid-size pension ($\alpha_{\text{mid-size pension}}$)	-7%	-17%	-70%	100%			
Large pension ($\alpha_{\text{large pension}}$)	-2%	-19%	2%	-2%	13%	100%	
Time δ	-2%	0%	-32%	-1%	-1%	0%	100%

Note that each parameter is perfectly correlated with itself, hence the leading diagonal is composed of 100 percent values. Also, the table is symmetric about the leading diagonal, so only the lower left values are shown.

The other aspect of mis-estimation risk is that it doesn't affect all lives equally, and that not all lives are of equal financial impact. For example, the large-pension cases account for the top 10 percent of lives, but they account for 39.8 percent of the total scheme pension. Table 1 shows that such cases have markedly lower mortality, but the standard error shows that there is relatively greater uncertainty over just how much lower. Furthermore, Table 2 shows that there is a correlation of -19 percent between the parameters for large-pension cases and males, so it is not sufficient to stress any one parameter in isolation.

QUANTIFYING THE RISK

If parameters are correlated to varying degrees, how can we perform a mis-estimation assessment? We cannot simply stress each parameter by a multiple of its standard error, as this ignores correlations. This is illustrated in Figure 1 (on page 11) for a simple Gompertz model with $\mu_x = e^{\alpha_0 + \beta x}$. If we stress the value of α_0 downwards, the best estimate of β increases, as shown by the black line in Figure 1.

Our solution is to use the whole variance-covariance matrix to generate consistent alternative parameter groups. This not only allows for the uncertainty over the parameters themselves, but it also allows for their correlations. There is also the question of how to allow for the fact that individual liabilities are impacted to different extents. Our solution is to value the entire portfolio life-by-life with each alternative parameter set. We repeat this *m* times to generate a set, *S*, of alternative portfolio valuations. *S* describes the financial impact of parameter risk and parameter correlations, while allowing for all individual characteristics and concentrations of liability. The percentiles of *S* can be used to investigate the financial impact of mis-estimation risk, say by comparing the excess of a given percentile to the median.

RESULTS

For the pension scheme in question, we generated *m=10,000* sets of alternative parameter values with the covariance matrix. In each case we valued the in-force liabilities with each parameter set. The 99.5th percentile of S was 3.97 percent higher than the median (the median of S was very close to the mean). This compares loosely to a typical insurer pricing margin of around 4–5 percent. Of course, there are other sources of uncertainty to be considered and a fuller list is given in Richards (2014). The final price also has to include insurer expenses and the costs of capital.

It is also possible to express mis-estimation results as a percentage of a standard table using the equivalent-annuity calculation. For this portfolio the equivalent best-estimate percentages of S2PA were 88.5 percent for males and 87.2 percent for females. Using the appropriate percentiles of   we can use the mis-estimation assessment to find a 95 percent confidence interval for these percentages. For males we get (78.7 percent, 99.5 percent) and for females we have (79.3 percent, 96.1 percent). The width of these intervals reflects the modest size of the scheme and the concentration of risk in a relatively small subset of lives. A larger portfolio would likely have a narrower confidence interval.

CONCLUSIONS

There are many potential risk factors which affect a demographic risk like mortality and the effect of these risk factors can be estimated using a parametric statistical model. The parameters in such a model have both uncertainty around their estimates and correlations with each other. Using the variance-covariance matrix for the estimated parameters, the mis-estimation risk for a portfolio can be straightforwardly assessed using the portfolio's own experience data. ■

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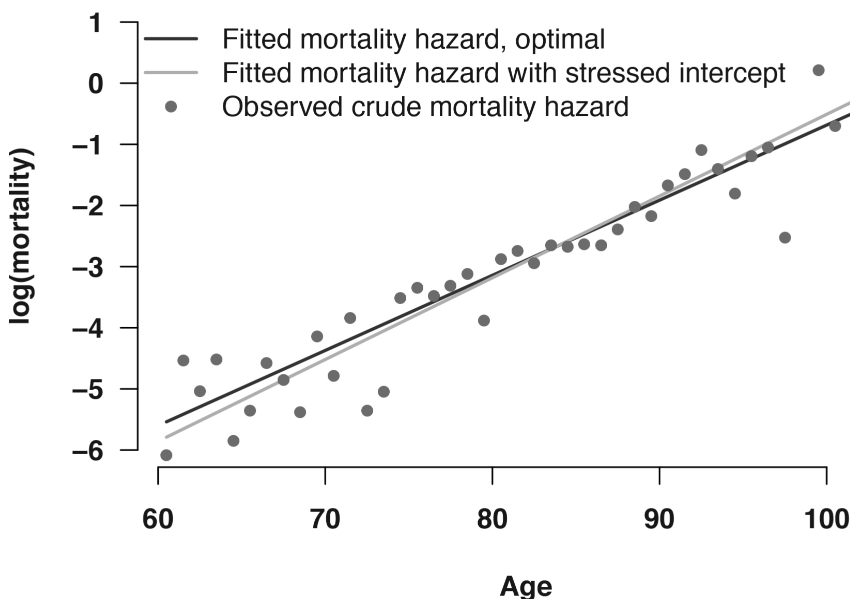
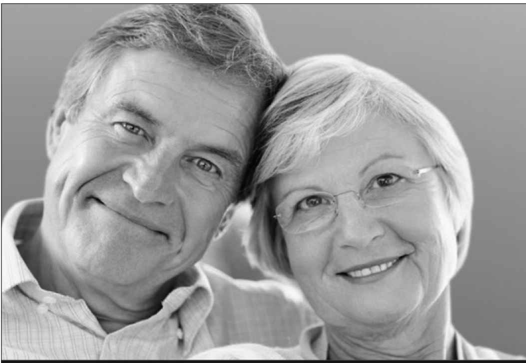


Figure 1. log(mortality) with best-estimate fit (black) and alternative fit with stressed intercept (grey).

Source: Richards (2014).



LIVING to 100

SOCIETY OF ACTUARIES
INTERNATIONAL SYMPOSIUM

Call for Papers—2017 Living to 100 Symposium

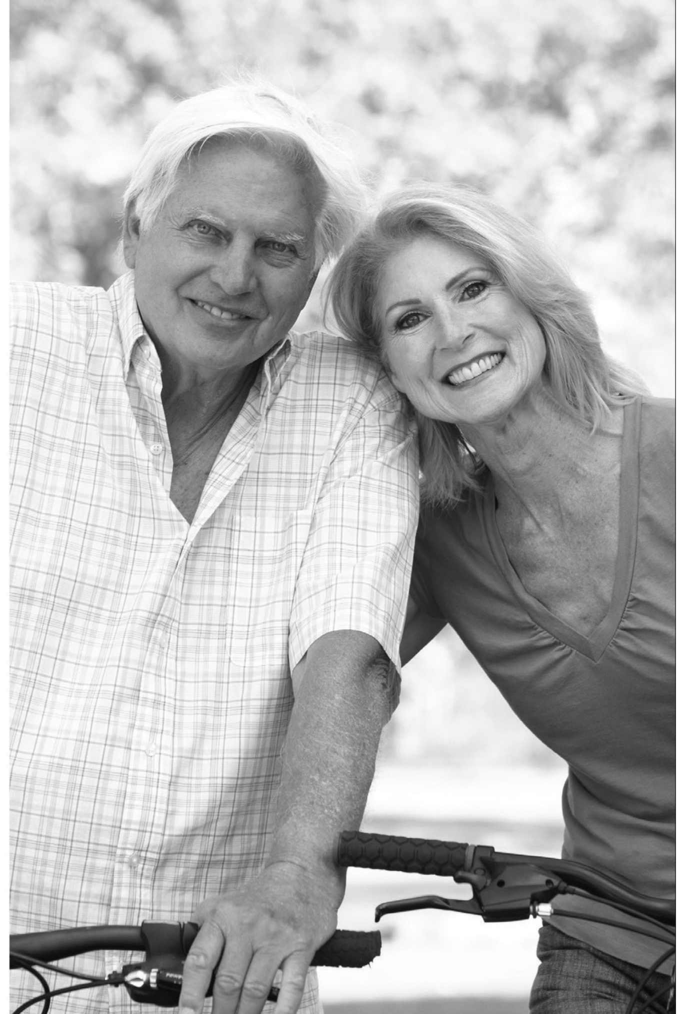
The Committee on Living to 100 Research Symposia requests professionals, knowledgeable in the important area of longevity and its consequences, prepare a high quality paper for presentation for the 2017 Living to 100 Symposium. The topics of interest include, but are not limited to:

- theories on how and why we age,
- methodologies for estimating future rates of survival and
- potential benefits and risks associated with the increasing numbers of retirees and potential answers to other difficult issues that arise.

Please submit an abstract or outline of your proposed paper by Sept. 30, 2015. The abstract should include a brief description of the subject of the paper, data sources and methods to be used, key items to be covered, and how your paper will contribute to current knowledge, theory and/or methodology.

A brief curriculum vitae or resume is also required.
Submit the information by email to:

Jan Schuh
Sr. Research Administrator
Email: *jschuh@soa.org*



Learn more about the call for papers, including the complete topic list, by going to Livingto100.soa.org

Questions may be directed to Ronora Stryker, research actuary, at *rstryker@soa.org*.

Actuarial Behavior Risks

By Timothy Paris

This article first appeared in the August 2014 issue of *Risk Management.* It is reprinted here with permission.

"Most of us understand that innovation is enormously important. It's the only insurance against irrelevance." - Gary Hamel

WHY ARE WE HERE?

Not existentially, but as actuaries. What are we supposed to be doing? What is the highest and best use for our special set of skills? To paraphrase the SOA: "actuaries evaluate the likelihood of uncertain future events, design creative ways to reduce the likelihood, and decrease the impact of adverse events that actually do occur."

As captivating as all that is, I prefer to say that we manage risks. Many of us may not think of our day-to-day work in that way, as it may be disguised as assumption-setting or developing and running sophisticated computer models. These are important functions, but they are means to an end—we are here to manage risks.

Which ones? We all know the roll call: investment risks, mortality risks, asset-liability risks, operational risks, and so forth, each with myriad subcategories and potential interrelationships.

But in just the last few years, the U.S. insurance and retirement security industry has hosted the coming out party for a previously under-appreciated risk—policyholder behavior. Adverse policyholder behavior results for deferred annuities have been directly responsible for billions in publicly disclosed losses: policyholders have been holding on to their valuable inforce guarantees at much higher rates than before the financial crisis, and in the face of this new experience data, actuaries' assumptions for future policyholder behavior have been updated commensurately, resulting in much higher levels of reserves for future inforce guarantees.

So that's it—a good blood-letting, bygones, then onward with updated assumptions, fingers-crossed? That would be pretty weak, and unworthy of our mandate to manage risks. Hope is not a risk management strategy. The insurance and retirement security system is too large and important to individuals and families to fail or endure repeated trauma like we have experienced in the last few years. But in order to manage policyholder behavior risks, we actuaries first need to manage our own behavior—our risk of being too comfortable with the status quo. We need to stoke our own ambition, expand our thinking, and develop new tools to actually manage these risks, for the dual benefit of improving our companies' and clients' ability to offer vital insurance and retirement security products to individuals and families, but also to improve our profession's value proposition in an increasingly competitive and fluid global employment market.

The gauntlet has been thrown. What are we going to do about it?

I would like to share a sketch of a powerful new tool to help answer the challenge posed by policyholder behavior risks. It starts with understanding large complex data.

Rather than make this overly abstract, let's stay where the problems have emerged, in the deferred annuity industry. Here there is a large body of complex data

CONTINUED ON **PAGE 14**

Timothy Paris, FSA, MAAA, is chief executive officer of Ruark Insurance Advisors, Inc. in Simsbury, Conn. Tim can be reached at timothyparis@ruarkonline.co.

describing the various aspects of policyholder behavior within these products—such as surrenders, partial withdrawals, annuitizations, mortality, investment fund selection, and optional benefit selection—for each company and across companies for the industry in aggregate. The experience data indicates that these behaviors are complex, with a range of cohorts and multiple drivers such as policyholder age, gender, policy duration, product type, relative value of guarantee features, and distribution channel. And in some cases, it seems that behaviors are interrelated—for example, policyholders that elect rich guaranteed death benefits tend to exhibit higher levels of mortality, as we would expect.

With this high level of complexity, unless we have a rigorous data-driven understanding of the dynamics, we have little hope of managing the risks effectively. This is why analysis of large blocks of each company's business and aggregation across the industry is invaluable—it increases the credibility of analytical refinements and understanding.

So the corporate risk management process must have command of the experience data in all of its glory. Do this first! Understand the risk profile of the business, how policyholder behavior risks and stress scenarios affect that, and how this contrasts with the industry.

What if we do this? Maybe some of us already have. What if we had a deep and quantitatively rigorous understanding of policyholder behavior for our company's block of business? What if we completely understood the surrender behavior cohorts and dynamics, so much so that we could convince another actuary of its validity for the future? Of course, we can never be absolutely certain in extrapolating historical data to the future. But if we are going to make serious progress on this issue, we should be asking ourselves what an ideal answer would look like, and then we can determine what type of adjustments to make in order to deal with shortcomings.

The answer would probably be pretty complicated. But intuitively, for each behavioral cohort, we should be able to express the behavior as a function of a benchmark along with random fluctuations. The benchmark would be a multivariate formula based on analysis of the historical data, likely including parameters for the factors noted above—age, gender, duration, product type, value of guarantee features, distribution channel, etc. The nature of the random fluctuations would be highly dependent on the level of variance between the actual historical data and the benchmark.

Much easier said than done! But think of this like an old fashioned simple linear regression model, where we are trying to fit the best trend line to some data points in two dimensions. Similar thinking applies here, but it is a surface in multiple dimensions—this is a difficult analytical step, and Generalized Linear Modeling techniques will likely be vital, the details of which are beyond the scope of this article. Results will vary between products and companies. But if we could do this, or if some of us have done it already, what would we do with it? Could we go beyond assumption-setting and use it to actually manage the risk?

Yes, I think so! If the benchmark really captures the non-random dynamics for the cohort, then the risk is really in the distribution function for the random fluctuations. As actuaries, surely we know how to construct financial transactions around random fluctuations. With deferred annuity guarantees, as noted above, the sort of behavioral fluctuations that tend to draw the most concern are low surrender rates, which increase the cost of guarantee features even net of the increase in fee or spread income for the base product. Let's consider a simple example.

Suppose that for the next quarter, we are interested in the probability that a block of policies are in the left side of the surrender rate distribution—lower than the benchmark. And suppose that if this happens, it means an average of 1 percent lower surrender rates, which would be a significant deviation in this context. We

should be able to use the historical data to estimate the probability of this happening. Let's call this probability p. Depending on the shape of the distribution function for the random fluctuations, p may take on a range of values. If the distribution function is symmetric around zero, then p=0.5, which would mean that the surrender rate fluctuations are akin to a coin toss. For one quarter, if the proverbial coin flipped tails and surrender rates were lower than the benchmark, would this have a large financial impact? Probably not. Most of us would probably view one quarter of deviation as noise, and although it would draw our continued attention, we would not be inclined to change our long-term assumptions for the future.

What if this happens again the next quarter, and the next? What if it is sustained, say for six quarters in a row? In our simple example, this is a plausible outcome that could occur with probability p^6, which is about 1.5 percent.

If this happened, then what would we think? We would probably change our expectation of the future in the face of this sustained and significant adverse deviation. This means that we would update our modeling assumptions for new business and inforce, and we would see reserve increases like the ones noted earlier—potentially costing billions. Again.

Unless we bought protection in advance.

Protection? Don't stifle creative thinking with legal and regulatory details just yet—we are working with big concepts right now. Start with the economics. If we could buy protection, how much would it cost? How much should it cost? Suppose we wanted $200 million of protection in the event that this event of sustained low surrender rates actually happened over the next six quarters. We would intend this to help defray the impact of the reserve increase when assumptions are updated. The probability of the event is about 1.5 percent. So the net premium for the protection should be about $3 million.

Of course, this would need to be loaded with a margin to cover expenses, risk, and profit for the risk taker. For an innovative type of "catastrophe" risk transaction which this is, it is difficult to be overly precise, but the margin might be about double the net premium. So the gross premium may be about $10 million to provide $200 million of protection for the next six quarters.

Can we buy decades-long protection for the life of the deferred annuity? Very unlikely. This is a data-driven transaction, and since the industry does not have decades of relevant policyholder behavior experience data to bring to bear for these types of products, the length of the protection period will be limited by that. But even a few years of coverage is a start, and can conceivably be pieced together and renewed sequentially. This is would be an important new tool in the risk management toolbox, with high financial value and high strategic value for deferred annuity writers and their stakeholders.

Perhaps most importantly, are there risk takers that would consider doing this? Bright ideas and hypothetical examples are fine, and there certainly should be demand for this type of protection on the part of deferred annuity writers who are beset with this risk and have so recently experienced its costly downside. But we need a counterparty to make a transaction—where is the supply?

As noted above, this type of transaction has a catastrophe risk profile and is data-driven with hard analytics, so we would be well advised to look to risk transfer markets with similar characteristics, like P&C "cat" and specialty reinsurers. The P&C reinsurance market is widely known for its cyclicality, and one of its important features is that it continues to provide capital to the market even after catastrophes make capital scarce, although the cost of this capital will naturally be higher. P&C and specialty reinsurers tend to opportunistically consider unusual types of opportunities to deploy excess capital, as is their well-documented situation now, especially when they fit their risk profile, they can underwrite and price based on first principles,

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and there is a diversification benefit with other lines—the situation with deferred annuity policyholder behavior risk fits the bill! Each company will have its own views on new types of opportunities and may consider them quietly, and each potential transaction will stand or fall on its own merits, but this certainly seems like a natural and promising area for supply.

It is up to us to lead our companies and clients away from catastrophe to safety. Actuaries should continue to design new products that are mindful of policyholder behavior risks and that are priced appropriately. But let's not stop there with our fingers crossed. Let's try something new—actively manage these risks. It will not be easy, but the solutions to the most important problems rarely are. It will require technical know-how, creativity, connectivity to the right market participants, and business savvy—exactly the behaviors needed by actuaries to be successful in the 21st century. ■

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Regulatory Update

By Jeremy Starr

The NAIC is in the midst of an all-out revision of the reinsurance of level term and secondary guarantee universal life policies. Activities include: creation of a new Actuarial Guideline (AG48—passed December 16, 2014), creating a new regulation that implements Rector recommendations (to be developed this year), Risk Based Capital (RBC) changes, a new supplement to the annual statement, financial handbook changes and changes in the treatment of certain captives. Finally, to make sense of these changes, the American Academy of Actuaries (AAA) is planning to develop a practice note on these changes.

A major point of the new guideline is that current statutory reserves must still be held by either the cedent or the reinsurer. AG 48 requires the calculation of reserves using the Actuarial Method. This method is largely the same as the Valuation Manual Minimum Standard 20 (VM 20) requirements (i.e., principle based reserves) with certain modifications. The key modification is to use factors applied to the 2001 VBT net level term premiums to approximate what the net level premiums will be using for 2014 VBT. These reserves need to be backed by Primary Securities. Acceptable assets for Primary Securities include: cash, and Securities Valuations Office (SVO) listed instruments (excluding: synthetic letters of credit, credit linked notes, etc.). In addition, for Modified Coinsurance or Funds Withheld reinsurance agreements, acceptable assets would also include: a) Commercial Loans rated CM3 and better, b) Policy Loans, and c) hedges purchased in the normal course of business covering "actual" risks. Other Securities can be used to back the excess of the currently required statutory reserves and AG 48 reserves. Other Securities include instruments that qualify for Primary Securities and assets approved by the commissioner. If between the cedent and the reinsurer there are insufficient Primary and Other Securities, the actuarial opinion will need to be qualified. This can be avoided if the deficiency is remedied prior to March 1 of the year when the filing of the annual statement occurs. AG 48 became effective Jan. 1, 2015 for all new issues.

New York Department of Financial Services (NYDFS) was one of the states that voted against the AG 48 framework. They are also not in favor of PBR. Instead, NYDFS has issued a revision to its XXX/AXXX statutory reserve calculation regulation, for 2015 issues and later, to allow the use of mortality improvement factors for the first segment. Subsequent segments cannot use improvement factors. The improvement factors are 1 percent for the first 40 years and 0.5 percent thereafter. Starting at attained age 81 the mortality rates shall grade back to the base table by attained age 90.

With these changes there are a few RBC issues. One issue relates to the assignment of RBC factors for those Other Securities that do not have an RBC factor. The NAIC has decided that assets that do not currently have an RBC factor will use the bond factor based on the ratings of the issuer. Another issue surrounds the additional RBC required when a qualified opinion is determined by the valuation actuary. Regulators decided that a qualified opinion solely based on AG 48 will not be subject to these additional RBC requirements. Furthermore, in instances where the reinsurer is not holding RBC associated with the risks they have assumed, the cedent must hold all of the calculated RBC. Currently there are two proposals as to how a short fall in Primary Securities effects RBC. One method would reduce Total Adjusted Capital and the other would reduce the Authorized Control Level directly.

A key concern of regulators was the lack of transparency of captive transactions. To remedy this situation, there will be a new supplement to the annual statement that will provide detailed information associated with meeting the AG 48 requirements. The new supplement is to be filed by April 1 of the year following the year studied (e.g., 2014 results filed in 2015). The supplement is divided into four sections:

- Part 1 - All XXX and AXXX Cessions;
- Part 2 - All "Covered Policies" as defined in AG 48. Covered policies are all XXX/AXXX policies reinsured except for those transactions associated with certain reinsurers, such as licensed reinsurers;
- Part 3 - Collateral for all XXX/AXXX Reinsurance Transactions Reported in Part 2; and
- Part 4- Non-Collateral Assets Supporting Reserves for All Affiliate XXX/AXXX Reinsurance Transactions Reported on Part 2.

CONTINUED ON **PAGE 18**

Jeremy Starr, FSA, MAAA, is president of Jeremy Starr Consulting, LLC. He can be contacted at jstarr@jsconsulting.nyc.

"LARGER INSURERS MAY BE MORE LIKELY TO POSE A SYSTEMIC RISK."

Another area that changed due to AG 48 is the Financial Analyst Handbook. The changes give guidance on the type of documentation an analyst should review to understand a company's use of captives. These documents include: Form D filing for the Captive, overall review of company's use of reinsurance captives and review of the new AG 48 supplement to the annual statement.

Early in 2014 a proposal was made by a regulator to have all captives that assume business from three or more states to be subject to all NAIC accreditation standards. Up until now captives have not been subject to these standards and thus individual states have created their own standards for captives. After a deluge of negative comments from industry, there is a new proposal made that would limit this requirement to transactions involving XXX, AXXX, AG 43 variable annuities and long-term care.

FINANCIAL STABILITY BOARD (FSB)

The FSB (an international group) is developing standards for determining whether a company is a Globally Systemically Important Financial Institution (GSIFI). FSB has issued a discussion draft of their criteria for determining a GSIFI insurer. In this discussion draft they indicate that reinsurers are unlikely to be systemically significant:

"The insurance market may become more concentrated, reducing competition and choice offered to customers. Larger insurers may be more likely to pose a systemic risk. However, there is no strong historic evidence that the interconnectedness arising from reinsurance business contributes materially to a reinsurer being systemic in distress or failure under normal circumstances. There is evidence that significant substitutability exists for reinsurance coverage amongst existing market participants and that following large losses new capital flows into the market as underwriting rates adjust. Authorities may place reliance on such evidence, but should bear in mind that uncertainty exists regarding interconnectedness and what may contribute to systemic risk in circumstances of significant distress."

While this statement is encouraging to many reinsurers, it in no way prevents FSB from declaring individual reinsurers systemically important.

The United States non-banking financial industry has complained about some facets of Financial Stability Oversight Council's (FSOC) Systemically Important Financial Institution (SIFI) review process. To begin to remedy this problem, FSOC announced on Feb. 4, 2015:

- Will allow a company to become involved in the review process once an investigatory team is established during Stage 2, rather than waiting until Stage 3;
- Investigatory team will have meeting with company on concerns that drove decision to move to Stage 3;
- Will consult with company's regulators and will provide them a non-public explanation of Council's decision;
- If a company publicly acknowledges it is under review, the Council, if asked, will confirm the announcement;
- The Council will issue a report to the public outlining their decision, but leaving out all confidential information;
- The Council will publish guidelines on how a company gets to Stage 1;
- A SIFI's status will be reviewed at least annually. Oral presentations by the company will be allowed once every five years, but written submissions will be allowed for all reviews; and
- The Council will announce in its annual report the number of companies, during that year, that: a) made it to Stage 3, b) were dropped after Stage 2, c) proposed final decisions and will report on the number of companies, in the aggregate, that were subject to a final decision.

INTERNATIONAL

International Accounting Standards Board (IASB) Insurance Contracts Project

During 2014, there were two changes made to the IASB proposed accounting for reinsurance transactions. For portfolio transfers, the Board clarified that the acquired policies should be treated as if they were newly issued policies. Those policies that were in payout at time of closing would be treated as either a discovery of a past loss or as an adverse development. The second change relates to renewal periods in which the direct portfolio results are running through the profit and loss statement. A primary example of this is when the portfolio becomes onerous. An onerous portfolio is one in which the present value of economic benefits (e.g., premium income) are less than the present value of liabilities. Once a portfolio is considered onerous, the change in reinsurance cash flows would run through the company's statement of profit and loss. The statement would thus show the mitigation of some of the onerous portfolio's risk due to reinsurance.

FINANCIAL INSTRUMENTS PROJECT

The Financial Instruments Project (IFRS 9) revises the accounting for financial instruments so that they are more in line with the true economic performance of the covered products. In the Insurance Contract Standard the method of calculating the impaired value of a reinsurance contact is specified in the Financial Instruments Standard. IASB describes the method as:

"Specifically, IFRS 9 requires an entity to base its measurement of expected credit losses on reasonable and supportable information that is available without undue cost or effort, and that includes historical, current and forecast information."

FASB TARGETED IMPROVEMENT TO US GAAP

In 2014, FASB decided that the difference between their version of the Insurance Contracts Project and the IASB version were irreconcilable. Since one of the primary purposes of the projects was to have one worldwide standard, FASB decided to drop the project. Instead, FASB will look to do targeted improvements to current GAAP standards. While it is clear that overall changes will affect reinsurance accounting, they have elected to not make changes to FAS 113 – Reinsurance.

COVERED AGREEMENTS

The Dodd-Frank Act allowed for covered agreements in situations where foreign competitors are treated less favorably than domestic companies. Dodd-Frank defines a covered agreement as:

"(2) COVERED AGREEMENT.—The term 'covered agreement' means a written bilateral or multilateral agreement regarding prudential measures with respect to the business of insurance or reinsurance that—

''(A) is entered into between the United States and one or more foreign governments, authorities, or regulatory entities; and

''(B) relates to the recognition of prudential measures with respect to the business of insurance or reinsurance that achieves a level of protection for insurance or reinsurance consumers that is substantially equivalent to the level of protection achieved under State insurance or reinsurance regulation."

Currently under discussion is a covered agreement for credit for reinsurance between a United States cedent and a non-United States licensed reinsurer (i.e., reinsurer is not licensed, accredited or certified). The impetus for this is that not all states have adopted the revised Credit for Reinsurance Law and Regulation. Further, there is inconsistent enforcement of the models in those states that have adopted the models. To promote uniformity in regulating the amount of collateral that a reinsurer must hold, a covered agreement using the

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language of the NAIC Models would create uniformity. If such covered agreements are signed, for the countries involved, they could rely on the covered agreement as the final say in how collateral is to be posted. Dodd-Frank Act states:

"(f) PREEMPTION OF STATE INSURANCE MEASURES.—

"(1) STANDARD.—A State insurance measure shall be preempted pursuant to this section or section 314 if, and only to the extent that the Director determines, in accordance with this subsection, that the measure—

"(A) results in less favorable treatment of a non-United States insurer domiciled in a foreign jurisdiction that is subject to a covered agreement than a United States insurer domiciled, licensed, or otherwise admitted in that State; and

"(B) is inconsistent with a covered agreement."

Finally, just as a note of interest, this year is the 30th anniversary of the original NAIC Life and Health Reinsurance Agreements Model Regulation. To celebrate the anniversary, it appears that the NAIC is planning to create some similar type regulation for property and casualty agreements. ■

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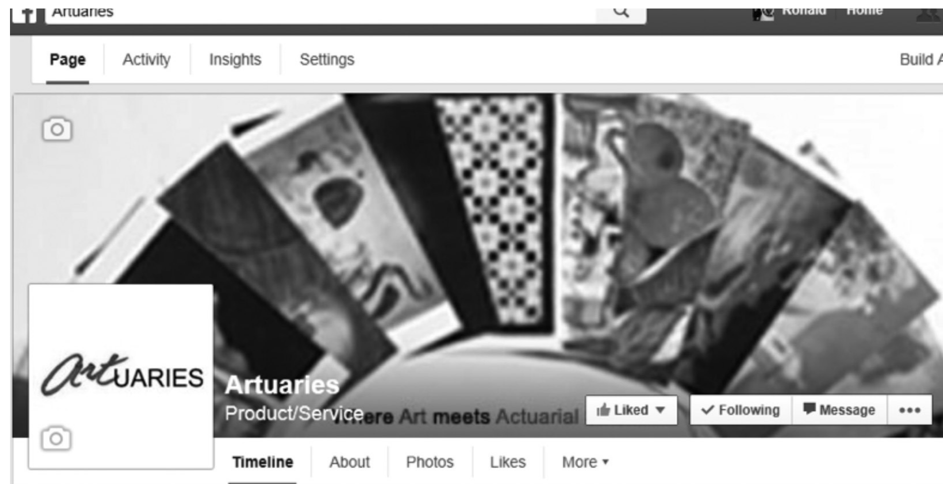
ARTUARIES—WHERE ART MEETS ACTUARIAL SCIENCE

By Ronald Poon-Affat



I have brought together a group of super talented actuaries to contribute to a unique actuarial/art/charity project called the Artuaries.

The present group includes 10 actuaries who are painters, photographers and quilters. The group does include one U.K. actuary, John Gordon, FIA, so we can legitimately claim to be global. The artwork is set out within the Artuaries Facebook page.

A set of greeting cards showcase the group`s artwork. These are available on the Actex website (www.actexmadriver.com) by searching the word "Artuaries. 100 percent of net profits are donated to the Actuarial Foundation; so it's keeping it all in the actuarial family.

HOW DID ALL OF THIS GET STARTED?

Even though I have minimal artistic and marketing talent, I grew up in Trinidad & Tobago during the '60s in a *Mad Men* environment. My dad was a McCann Erickson Art Director. I eventually brought Dad out of retirement to design the project`s iconic logo.

I came up with the initial idea whilst visiting the home of my longtime friend and actuarial mentor Debi Gero who impressed me with both her deep passion for art history and a prolific contemporary art portfolio. I wanted to share Debi`s art with a wider audience and thought that there must be other artistic gems in the actuarial community. The name Artuaries was the brainchild of Debi.

Very early on, I reached out to Anna Rappaport, past president of the Society of Actuaries (SOA) and a dedicated artist, to discuss how to create a project that would be sustainable and have the greatest impact. Anna was the pragmatic voice who suggested that the first project should be a set of greeting cards that would be timeless (as opposed to a calendar, say), easy to manufacture and distribute and not be too expensive.

WHAT WERE THE CHALLENGES?

The main challenge was to find actuaries who are interested in art and would be interested to show their art. Artistic actuaries are not as boastful as long distance runners, say, so it was quite a challenge to uncover artistic actuaries. Thankfully, we live in an age of social media so Facebook and LinkedIn played an invaluable role in attracting other artists to come out of the woodwork.

To join this merry band, one did not have to be professionally trained; the only qualification was that one had to be an actuary and to have created art that you wanted to showcase.

Just like financial services, distribution is key to a successful operation and Gail Hall of Actex stepped up to the plate volunteering to facilitate the sale of the cards on Actex`s site. We cannot thank Gail enough for her assistance. It was our goal to keep it totally nonprofit and actuarial so the Actuarial Foundation was the obvious candidate to be the recipient of our net profits from sales.

NEXT STEPS

A lot has been achieved to date. The artists have been assembled, the cards have been produced, the distribution is in place, the charity has been identified and the artists were profiled in two editions of The Actuary magazine; so what else is there to do?

The present twin goals are to attract more actuarial artists from around the world to the project and to find a tipping point that will substantially increase sales and fund raising. Next steps will be the roll out of a pipeline of projects to proudly display actuarial artwork on calendars, coffee-mugs, t-shirts, caps, etc.

When the project was started the main goals were to raise funds for the Actuarial Foundation, create a network of like-minded actuaries, showcase their art and show the world how cool actuaries really are. On that measure, I think that we are on the road to being a success. ■

Please like us on Facebook

Ronald Poon-Affat, FSA, FIA, MAAA, CFA, is vice president and director of RGA South America based in Sao Paulo, Brazil. All interested actuarial artists can contact Ronald at rpoonaffat@rgare.com

LEARN Program Update

By John Cathcart

John Cathcart, FSA, MAAA, is VP & medical research actuary for Swiss Re Life & Health America. John can be reached at john_cathcart@swissre.com.

The Learn program had a very active year in 2014. Presentations were made for three states—Alabama, Georgia and Minnesota—bringing to 26 the total number of states that have had presentations since the program's inception in 2010. Many thanks to Larry Stern, Davis Nussbaum, Michael Frank and Jeff Katz for their contributions as presenters in 2014.

2015 promises to be even busier with requests from 10 states for presentations—Connecticut, Michigan, NorthCarolina, Oklahoma, Oregon, Pennsylvania, South Carolina, Vermont, Washington, and Wyoming. Many of these requests are for repeat presentations which is testament to the value that this program provides.

If anyone is interested in learning more about the program or possibly joining the pool of presenters, please contact John Cathcart at John_Cathcart@swissre.com. ■

When The Battle Lines Are Drawn

By Bob DeMarco

Bob DeMarco is vice president with Sun Life Financial in Hamilton, Bermuda. Bob can be reached at silentbob1492@ hotmail.com.

The following first appeared in the June 1985 issue of *Reinsurance News.*

It is no news to anyone that the current reinsurance environment is changing—that the relationship between ceder and reinsurer is evolving. But as the form that this change is taking becomes clearer, the question arises whether it will be a higher evolutionary life form or a mutant created by the aftermath of battle. The avenues of communication between ceder and reinsurer appear to have become more strained but is this just the creaks and groans of the evolutionary process or the drawing up of the battle lines in preparation for confrontation?

One definition of evolution is: "The process by which a species, over an extended time, adopts those traits which ensures its highest probability of success." Reinsurance has evolved from the need of the direct writer to obtain increased capacity to write business either by class or volume that it ordinarily could not prudently undertake. It should be obvious that the reinsurer cannot survive without the continued profitable survival of the direct writers, but it should be equally clear that the direct writer cannot survive without the continued profitable survival of the reinsurers. Therefore, the tradition of partnership and cooperation arose, with both ceder and reinsurer taking the same side of the field. The agreements covering these partnerships were deemed "treaties" (not contracts) and informally referred to as "Gentlemen's Agreements" out of the tradition of a "Gentlemen's Word" common in the 18th and 19th centuries. These are some of the evolutionary traits adopted by the industry and if you accept my definition of evolution, then they were adopted because they ensured the industry's success. But these very traits are the ones that the new reinsurance environment is threatening to obliterate.

We have already heard the rattling of sabers on both sides in a battle that has the potential to tear the delicate fabric of our industry apart. So far the probing has been limited to actions which are typified by the insurgence of an adversarious tone to reinsurance negotiations, the ever increasing length of the treaties, and lawyers discussing "contract" terms and the parties rights to court remedies. The environmental change has, occurred because of the climatic changes in the direct writing industry of: replacements; facultative shopping; and changing risk profiles, as the industry is forced to compete ever more fiercely for the policyholders' investment dollars. These are the difficult issues around which the battle lines are being drawn. If the battle is ever allowed to actually rage, it is the lawyers that will feast on this carrion and I am convinced that the reinsurance form that will emerge will be a mutant. I say this to in no way denigrate the legal profession that is their function (when I refer to the legal profession I am including the judiciary as well). When a community can no longer agree on its standards of ethics and morality, it employs the legal profession to protect itself from the unthinkable eventualities perpetrated by the few. A lawyer's function is to think the unthinkable and protect their clients from such possibilities. 'What it boils down to is that the individual's ethical and moral responsibilities are abdicated to the legal profession. Why we haven't, historically, seen penetration of the legal community into reinsurance is that the complexities of the business allows for so many "unthinkables" the resulting document would no longer be workable; but primarily because the interlocking relationship demanded by reinsurance has required ethical conduct more certain than allowed by a "caveat emptor" approach so prevalent in other 20th century businesses. Therefore, the real battle wages over whether our industry is prepared to abdicate its moral and ethical responsibility to a third party referee.

There has undoubtedly been a shift in the ethics of our industry over time. C.E. Heath once said that if the client thinks he was covered, ttien we have a moral obligation to honor that claim. How many claim officers would have a job today if they attempted to adopt Heath's view? Certainly, as Heath's view pertains to the client versus direct writer it might well be called bucolic, but that is due to the public's attitude towards the insurer. However, when applied to reinsurance it should still be viable. After all, the direct writer should know far better than the general public that when you "put it to" your

CONTINUED ON **PAGE 26**

"THE DAY WHEN THE COURTS ARE CALLED UPON TO INTERPRET REINSURANCE AGREEMENTS WILL BE THE DAY THAT 'UTMOST GOOD FAITH' MAY WELL BE A THING OF THE PAST."

insurer you weaken the whole framework from which it operates.

Therefore, the tendency of the ceder to view the reinsurer as a controllable cost element of doing business and shrugging off the reinsurer's loss as the reinsurer's problem is taking a very short-term, self-limiting view.

Likewise, the tendency of reinsurers to constrict the treaty language to the narrowest possible interpretation and make the coverage so incomprehensible that the ceder can never be sure if he has the coverage or not, is pushing the industry all the closer to the edge. I am convinced that many have forgotten the doctrine of "uberrima fides" which is the corner stone of the reinsurance industry. The day when the courts are called upon to interpret reinsurance agreements will be the day that "utmost good faith" may well become a thing of the past. Unless our industry is prepared to reaffirm the ethical standards and acknowledge the mutual dependence on which those standards are based that day may not be far off. Should it arrive, the resulting mutation to the reinsurance industry may not be the one best equipped for survival. For courts are illequipped to resolve reinsurance differences. While some may welcome the security of the blindfolded "Lady of Justice", the impacts of court intervention to reinsurance agreements will have far reaching impacts to the industry in general. For example, how might State Insurance Departments react to reserve credits on reinsurance agreements that can be over-turned by the courts, or claim payments that remain uncollected while the reinsurance cover remains in litigation for years without end in sight? It is inconceivable that in the short span of a trial any judge should be expected to comprehend all the vagaries of the reinsurance profession, therefore, "reinsurance experts" will abound similarly to the medical expert in malpractice suits.

There are undoubtedly some who would say that this is a particularly harsh point of view. That the change we are experiencing is simply a healthy movement of the reinsurance industry to adopt prudent and consistent business practices. After all haven't both Federal and State regulatory authorities moved to tighten up reinsurance practices? I am certainly not advocating stasis for the industry. Evolution is certainly a necessary and inevitable process of survival, but evolution is a slow, trial and error process. Before tossing the bath water shouldn't we check to be sure the baby isn't still in it? ■

Why The Financial Crisis Inspired An Actuary To Be An Author

Does the Actuarial Profession have a wider Public Mandate to fulfil?

By John Gordon

I don't count myself among the small number of people who foresaw the financial crisis that began in 2007 (for those interested in the genuine article I cannot recommend Ann Pettifor's 2006 book *The Coming First World Debt Crisis* highly enough). But it was evident to me that much of the supposed boom we'd witnessed in the years leading up to it was being fuelled by little more than debt and optimism, and it was also apparent to me that the activities of some sectors of the financial services industry were contributing significantly to the problem.

The collapse of Lehman Brothers in particular was a truly seismic financial event, and I remember widespread pronouncements in the immediate aftermath that there can be "no return to business as usual." What I find fascinating is how little has really changed. While it is true that the global economic situation is much improved, achieving that has required state intervention on an unprecedented scale and has taken us into uncharted fiscal waters.

Regarding the blood bath on Wall Street and subsequent self examination, villains and good guys (albeit not so many) were clearly identified. Names have been named and people have been accused, fingers have been pointed and reputations have been tarnished. For me it was interesting that for the Insurance and Pensions industry which did not go unscathed in the Financial Crisis, the financial press has been more lenient—especially in its attitude towards the financial architects and risk management guardians of our industry, not least among them the actuarial profession.

I have thought long and hard regarding why more actuaries have not taken the time to examine the root cause of the crisis and its impact on the insurance and pension industry, and to challenge the actuarial profession to critically self-examine its role in the financial world. In a nutshell I have sought answers to the question of where, how and why have we not undertaken such an exercise.

PUBLIC ROLE OF THE ACTUARY

What the crisis demonstrated above all else was the degree to which perverse incentives can eat away at the moral backbone of those in positions of responsibility. In that regard, I would note that there have surely now been enough high-profile cases to the contrary to dispel any notion that this particular disease has any respect for professional boundaries.

The crux of the problem is that I believe in recent years my profession could have served the public interest more effectively than it did, and did not serve the public interest as well as the public had reason to expect it to.

One way in which I think the profession could help its members better serve the public interest mandate in the future would be to better clarify what that mandate means in practice. Is it surprising that so few actuaries are effective in serving the public interest beyond the confines of what's required of them in the day job when basic questions such as "who are my public" and "what is the public interest" are left so open to interpretation?

We are keen to promote our risk management credentials as a profession that purports to take a long term view. We should be reflecting on how we can most effectively respond to the threat that unpredictable risks pose to our collective long-term interests and the public interest that we are mandated to serve.

Perhaps the best place to start is by questioning personal motives. What is important to you? Are you happy with the way your profession is representing your interests? Are you happy with the way both it and you represent the public interest? How much time do you spend thinking about public interest matters that reach outside the confines of your day job? How do you feel about the reputational risk of not speaking out on some of those issues, either for you individually or for your profession as a whole?

CONTINUED ON **PAGE 28**

John Gordon is a U.K.-based independent actuary and consultant. John is contactable at j.gordon@clara.co.uk

"THE REPUTATION OF A PROFESSION IS MADE OR BROKEN NOT JUST BY THOSE WHO LEAD IT, BUT BY THE DEEDS OF THOSE WHO FILL ITS RANKS."

OPPORTUNITIES FOR ACTUARIES IN A CHANGING WORLD

Looking ahead, there are many areas of public interest that could benefit from the application of such vision and skills.

The examples I include below illustrate the range of opportunities that might be open to a profession that was more passionate about the public interest. I would also venture to suggest that most of them represent rather more pressing needs than some of the activities that presently occupy our time.

1) Actuaries Can Do Banking (and should)

2) Economic & Financial Market Reform: A new economic vision of the future is urgently required. Who better than a profession of risk management experts with long-term vision to help develop and promote it?

3) Public Sector Reform: The idea that the public sector is riddled with inefficiency has been with us for so long that it has increasingly come to be accepted by many as a fact of public sector life. As a Profession we could better serve the public by helping to improve the efficacy with which taxes are spent.

4) Private Finance Initiatives: As these have a history of providing poor returns to the taxpayer, perhaps there is an opportunity for a commercially-minded profession well-versed in the art of analysis and financial management to assist Government in better expediting them.

5) Pensions Reform. The combination of economic and demographic challenges continues to grow across the developed world, and actuaries should rightly be expected to take a lead in confronting them.

6) Government Policy Initiatives: We could do much to enhance our own risk management credentials by being more proactive in promoting public debate and formulating policy initiatives in some of these areas (economic reform, population growth, the management of scarce resources, etc.)

7) International Collaboration: Global problems, from tax havens to financial crashes to radical overhaul of economic systems to global warming to energy crises, demand global solutions. With a coordinated approach, we are well-placed to assist.

8) Tax Reform. Globally and nationally, our system of taxation is overly complex, inadequately targeted and easily exploited. The profession is well placed to help inform a new, more transparent system of taxation that better serves the long-term public interest.

9) Renewable Energy and Recycling Policy: Could the profession not bring its risk analysis and projection skills to bear in articulating a longer-term business case based on a more realistic economic cost/benefit model?

10) Transport Policy: One doesn't need to look beyond the relative cost of road, rail and air travel, and how the relative cost of each has changed in recent decades, to see that a new vision is required. The actuarial skill set is well-suited to the task of helping to formulate it.

11) Carbon Costing: The development of reliable carbon models is growing in importance as the scale of the global warming challenge becomes clearer. Actuaries are well-qualified to provide input both into modelling techniques and to support analysis and projection of long-term costs and benefits.

Some of the later entries in particular are a full spectrum away from our traditional interest areas. I am not suggesting for a moment that the profession should seek to embrace them all even if its investment would be welcomed. But if the profession is to be seen as a force for good in a brave new world, these are the kind of initiatives it would help for it to be seen supporting. They are also the kind of public mandate initiatives that the world desperately needs to be supported.

IN SUMMARY

I conclude and strongly endorse the view that the world needs actuaries, or to be more precise the view that the world needs people who have the kind of skills that actuaries' typically possess. But we need to question individually and collectively whether those skills are presently being utilized to best effect. I believe that as a profession we need to invest our skills, training and intellectual capital rather more wisely than we presently do if we are ever to convince the public that it needs us.

If we can rise to the challenge, I see at least four big benefits to the Profession in doing so:

- The profession has a clear public interest mandate to fulfil.
- The profession clearly sees risk management as a growth area, but it will convince few of its credentials in this area until it can find something meaningful to say about the risks that matter.
- The profession is by its own admission one whose members are trained to take an objective long-term view, an attribute that elsewhere looks to be as scarce as ever. Finding a long-term voice to match its long-term vision would enhance the profession's reputation and might help to promote longer term thinking where it is most needed, namely in the minds of those who govern us.
- The Profession has talked much over the years about applying its skillset to areas beyond the traditional insurance and pensions comfort zone, but with limited success. A paradigm shift of the kind I advocate would help to turn this aspiration into reality, to the benefit of the public interest and to our own employment prospects.

I am under no illusion as to how what I advocate will be received by some of my professional colleagues. The result will, I expect, leave me accused of many things —arrogance, temerity, precociousness, presumptuousness, insolence or disloyalty all seem possible—but at least a lack of ambition should not be among them.

The reputation of a profession is made or broken not just by those who lead it, but by the deeds of those who fill its ranks. How will history judge us? I would like actuaries to think long and hard about if we need to chart a different course; we must each take individual responsibility for effecting a paradigm shift. If you too believe that your Profession could improve how it represents the public interest, what are you going to do to help it do so? ■

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