NOTEWORTHY READS

By Tim Cardinal

Noteworthy Reads has a simple aim—to inform our readers of good sources on models; specifically, to point out sources beyond what we can include in a newsletter. *Noteworthy Reads* will select a few and provide mini-reviews.

Models are a central component of the actuarial skill set, as they are foundational to risk management and principle-based reserves, capital and accounting. Models will become even more important in the future as they take a greater role in solvency and financial reporting.

As a member of Society of Actuaries (SOA) exam curriculum committees, I am exposed to and peruse a wide range of foundational and emerging topics related to models. Modeling topics are being added throughout the SOA exam syllabus—from model methodologies to assumptions, validation, governance, efficiencies, applications, and more.

So, onto our first installment of *Noteworthy Reads*.

Heavy Models, Light Models and Proxy Models
by The Proxy Model Working Party
Institute and Faculty of Actuaries, 2014

Link: *http://www.actuaries.org.uk/research-and-resources/documents/heavy-models-light-models-and-proxy-models-working-paper (available for free)*

I place this in the must-read category. A fundamental issue we are/will be facing is meeting increased demands placed on models in Own Risk and Solvency Assessment (ORSA), Solvency II, VM-20, and other principle-based approaches with deadlines—that is, achieving speed, fidelity and usability simultaneously.

This outstanding paper explores types of proxy models available to practitioners, the options available in the design and implementation of a model, and the potential impact of the choices made. Four specific proxy models are discussed in greater detail: replicating polynomials, radial basis functions, replicating portfolios, and commutation functions. Two of these are the subject of a case study of a fairly simple life insurance liability.

Monte Carlo Methods and Models in Finance and Insurance
by Ralf Korn, Elke Korn and Gerald Kroisandt
CRC Press, 2010
Link: http://www.crcpress.com/product/isbn/9781420076189

Sometimes we take for granted basic model integrity or that one model works for everything. Are those random numbers really random? Are all Monte Carlo methods equal? Does the context matter? How do we go from the theoretical underpinnings of stochastic processes to practice—using and applying stochastic models in our daily work? I like this book as it provides "what's, how's and why's." It strikes a good balance between accessibility and rigor without going overboard on the theoretical mathematics.

Measurement and Modelling of Dependencies in Economic Capital
By R.A. Shaw, A.D. Smith and G.S. Spivak
British Actuarial Journal, Vol. 16, Issue 3, September 2011

Link: *http://www.actuaries.org.uk/research-and-resources/documents/measurement-and-modelling-dependencies-economic-capital (available for free)*

Understanding and modeling dependent relationships are a challenge. This paper explores different approaches to modeling dependencies ranging from basics to copulas to causal models with feedback loops. The authors posit that "the economic capital model can be seen as a combination of two key components, the marginal risk distribution of each risk and the aggregation methodology which combines these into a single aggregate distribution or capital number. This paper is concerned with the aggregation part, the

methods and assumptions employed and the issues arising."

How to Measure Anything: Finding the Value of Intangibles in Business
By Douglas W. Hubbard
Wiley; 3rd edition, 2014

Link: *http://www.amazon.com/How-Measure-Anything-Intangibles-Business/dp/1118539273/*

Businesses rely on metrics. One of the central tenets of risk management is measurement. Sometimes our nose is too close to the picture, and it is good to take a step back and look from afar. Hubbard, through numerous examples, steps back to explore improving the value of decision-making information. Are you asking the right questions? Do you have the right data? Are you using the right metrics? Hubbard provides a guide on how to define, determine and use metrics in a world of risk and uncertainty. One of Hubbard's examples includes Fermi problems as described in Runhuan Feng's article, "A Thought on Fermi Problems for Actuaries," in this issue of the newsletter.

SOA, ACLI, CIA and IFA Research
I suggest you bookmark and make a habit of window shopping these and other actuarial organization sites. There has been a proliferation of papers related to all aspects of models. For example, Canadian Institute of Actuaries (CIA) papers include *Risk Assessment Models* and *Use of Stochastic Techniques to Value Actuarial Liabilities under Canadian GAAP.* Just a few of the SOA papers published in 2014 related to experience and assumptions include:
- Modeling of Policyholder Behavior for Life and Annuity Products
- Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans
- Variable Annuity Guaranteed Living Benefits Utilization.

These were all good reads but only a few of the many. *Noteworthy Reads* suggests checking out the Research & Publications pages at:
https://soa.org
http://www.cia-ica.ca
https://www.acli.com
http://www.actuaries.org.uk

Future *Noteworthy Reads*
Future *Reads* will come from our universe of readers. If you have a suggestion related to models, please email us at tcardinal@actuarialcompass.com. Send your nomination to *The Modeling Platform* editors. We will compile and select suggestions (with due acknowledgment).

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