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## A Handful of Economic Capital Model Observations

By David M. Walczak

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To join the section, SOA members and non-members can locate a membership form on the Joint Risk Management Section webpage at <https://www.soa.org/sections/joint-risk-mgmt/>.

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# Council's Corner

By Mario DiCaro

Recent changes in my responsibilities at work have resulted in a lot more exposure to the world of predictive analytics. Our company is composed of many group companies. For me this creates a work environment with a wide and ever-changing set of problems to work on. From a capital modeling perspective, this creates fungibility risk and valuations work for acquisitions. From a predictive analytics perspective, we get to learn the pricing, underwriting and claims details of many lines of business, which creates a lot of issues with accessing data sets. From a people perspective, there are unlimited opportunities for collaboration!

The knowledge I have about our organization and people has proven to be very useful in the predictive analytics work. This is not necessarily from a technical point of view, as a lot of the tools are quite different, but from a people and organizational point of view. I know which lines of business are run by how many people. I know what their net incomes and reserve risk are. The organizational knowledge I have helps me determine which projects we need to spend the most time on. Some projects are very interesting but even if extremely successful will hardly make any difference for the company. Other projects barely need to make any improvement at all to profit margins to make a big difference.

I have two bits of advice for people newer to actuarial work. This probably applies to all corporate work. First, know what the next step is on each project you are responsible for. Second, work with people.

The first bit is an idea distilled by a time management writer named David Allen. Like most useful ideas, it seems simple, but it wasn't something I had paid attention to in my earlier days. Now I do. Projects stall usually because whoever is working on that project doesn't know what the next step is. If they do know what the next step is, and the project is still stalled, then *usually* the solution lies in my second piece of advice.

Work with people. Don't expect someone to do your job for you or to fill your brain with knowledge available on the internet. But if you are at a step in a project where you've learned what you can and/or some component of the next step is actually not your job, or outside your domain, then it's time to reach out.



These two practices have helped me quite a bit—maybe they will help you too.

Now for my final subject. This is the last time I'll be writing for *Risk Management*. My time is up on the Joint Risk Management Section (JRMS) council. Florian Richard, who will take over as chairperson, and the rest of the committee will do a fantastic job running the section!

I am a member of the Casualty Actuarial Society and this is the first time I've spent a lot of time working within the Society of Actuaries and the Canadian Institute of Actuaries. It has really been a pleasure. I learned how the societies work a bit and what sections do for their members and the actuarial community. I don't know of any other crossover section dedicated to a specific actuarial discipline. It makes sense for enterprise risk management, though, as it is work that can best be accomplished with the widest view of an organization.

The biggest challenge the JRMS faces is keeping the members of the JRMS involved. Most of the wider membership of the JRMS is not aware of the opportunities to volunteer or sometimes even what the JRMS does. I think this is partly something the council needs to resolve and partly a function of the communications environment we operate in. Please, if you're interested in doing something, let us know! There are many things to do. One thing we need at the moment is speakers at conferences and local actuarial clubs.

I want to thank everyone I've had a chance to collaborate with in the JRMS as a committee member and as chair of the committee. It's a lot of work, if you dig in, but it's rewarding, and it has enriched my life being involved with colleagues from other companies. ■



Mario DiCaro, FCAS, CERA, MAAA, is VP, capital modeling and analytics, at Tokio Marine HCC. He can be reached at [mdicar@tmhcc.com](mailto:mdicar@tmhcc.com).

# Staff Corner

By David Schraub

To continue the transparency effort, this Staff Corner is about how the Society of Actuaries (SOA) schedules email blasts and how members can set up their email preferences to ensure they get the emails they need.

An email targeted to you is welcomed information. An email not targeted to you is more often not welcomed. This dichotomy is important for both the sender—the SOA—and the receiver—you—as both parties have a role to play to improve the signal-to-noise ratio.

## ON THE SENDER SIDE

Let's understand how the SOA uses email to raise awareness and engage our members and friends. Keep in mind that the SOA operates in a legal environment with requirements like General Data Protection Regulation in Europe and Canadian spam law. In addition to what's legal, the SOA strives to do what's effective, and we are always refining our practices. Essentially, we hope to give our members and stakeholders the information they want at the right time.

An email targeted to you is welcomed information. An email not targeted to you is more often not welcomed.

How do we do this? For each blast email, we prepare an email pull from our database using selected criteria. Usually, the criteria include the following:

- section membership,
- primary area of practice,
- credential,
- years since designation,
- geographic area and
- past event registration.

This allows us to ensure only the relevant target audiences receive a specific email.

We are working on adapting our process further and would like to offer additional choices based on more specific preferences of frequency and interest areas.

## ON THE RECEIVER SIDE

We hear frustration from members when important emails are not received or too many emails are received. The most common causes for missed email are (1) incomplete email preference choices and (2) company filter or individual automated rules moving the email to the receiver's junk folder. (Please check your spam settings.)

Yes, personal settings are key to filtering out noise and receiving the relevant emails from the SOA. Let's investigate email preferences further, then discuss how to set up your profile.

### Email Preferences

After you log into your account at [SOA.org](https://www.soa.org), you can click on the link for email preferences to access the Manage Email Preferences page (Figure 1, next page).

This new page (Figure 2, next page) gives you several options for choosing which emails you want to receive.

### General Toggle Button

We first have a general toggle button with the following options:

- I agree to receive SOA emails [...]
- Please unsubscribe me from all SOA email lists [...]

Within the first choice, you will receive emails based on the information in your profile, such as your primary area of practice, your geographic location and so on. If you would like to receive only specific information within certain areas of interest, such as data-driven tools or business management, you can further select those topics from the list.

### Section Emails

Section members have a dedicated toggle button with the following options:

- I agree to receive email from the section of which I am a member [...]
- Please unsubscribe me from all SOA section emails [...]



Figure 1  
Accessing Email Preferences

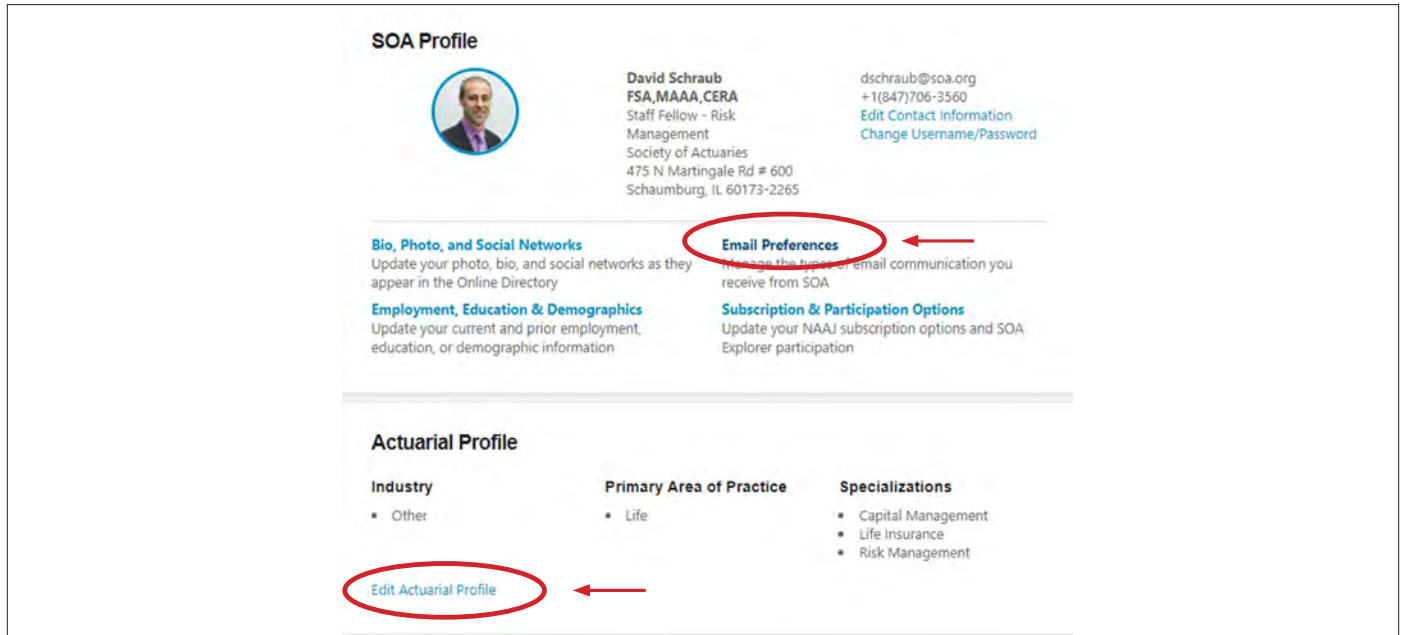
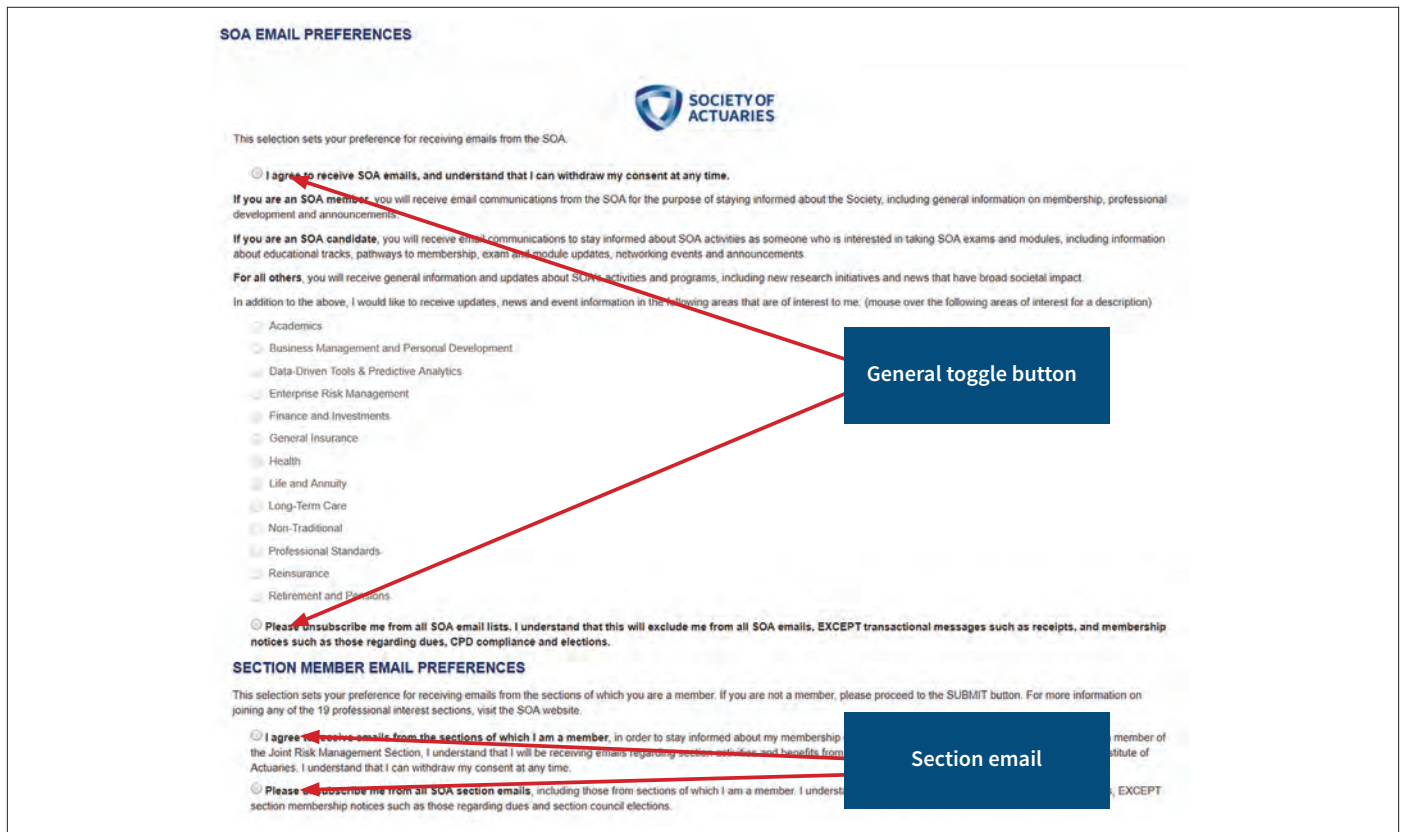
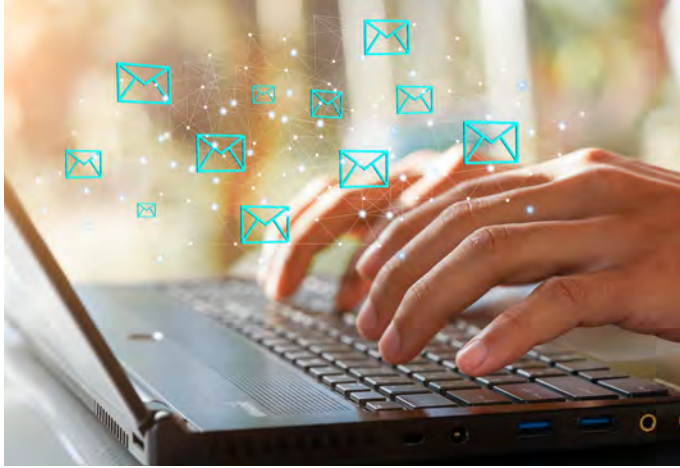


Figure 2  
How to Manage Email Preferences





If you unsubscribe from the section emails, you will still receive emails that pertain to your membership in the section.

### Actuarial Profile

Another way the SOA customizes the email you receive is based on your actuarial profile. To access your options, click on the link Edit Actuarial Profile at the bottom of the profile page (see Figure 1). You can update your primary area of practice, industry, any specialization and other information. As part of your actuarial profiles, your section membership and actuarial credential are listed but can't be changed there.

### FREQUENTLY ASKED QUESTIONS

With that foundation set, let's conclude with some frequently asked questions.

#### What Should I Select If...

***I am an SOA member and I receive irrelevant SOA emails.***

The email communication is tailored to you based on your SOA profile. Please check if the area of practice listed on your profile

is most aligned with your current situation. On the email preference page shown in Figure 2, you can check the areas about which you wish to receive updates.

***I am coordinating my firm's involvement with the SOA and I want to be in the loop; I participate in research and I want to be aware of any requests for proposals (RFP) in my field.***

The best way for potential sponsors, presenters or other stakeholders to ensure they are receiving all pertinent information is to go to the SOA website and create an account. For more targeted email, please fill out your email preferences.

Alternatively, you can sign up for the relevant section and ensure this section toggle is correctly set. This is one of the main benefits of being a section member.

A third option is to sign up for a *listserv* relevant to you.

***I am an FCAS, member of the JRMS, but I am not aware of JRMS webcasts.***

Please check your email preference settings. You may have requested the section communication to be turned off. Also, please check your company firewall and junk mail settings.

### WHAT'S NEXT

The SOA is investigating ways to reduce the volume of email and further tailor communication to each member. We are exploring various ways to produce customized newsletters and emails to better serve members' individual needs. Stay tuned! ■



David Schraub, FSA, CERA, AQ, MAAA, is a staff actuary for the SOA. He can be contacted at [dschraub@soa.org](mailto:dschraub@soa.org).

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# Editor's Note

By Florian Richard

**W**ith the end of the year just around the corner, I first would like to wish all our Joint Risk Management Section (JRMS) members a happy holiday season!

2019 has been a year of changes for the JRMS newsletter. One of them was the move from a paper newsletter to a digital newsletter, to allow readers to easily access the content with the various technological devices that are commonly used. We are always trying to think of ways to improve the experience for our readers.

In 2020 we will transition to a continuous flow of newsletter content. Instead of printing three newsletters per year, we will be digitally sending you two to four articles every other month. This will allow us to provide you with time-sensitive information faster, as well as being able to share the latest research and other resources with you.

If you have additional suggestions or want to volunteer, please do not hesitate to reach out to David Schraub or me.

The November issue of *Risk Management* opens with an article from David Walczak that dives into lessons learned from capital modeling over the past decade. "A Handful of Economic Capital Model Observations" tackles topics such as the communication of results, untapped risk management uses and strategic uses of the model.

In "A Gigantic Risk Management Entertainment System," Dave Ingram challenges the role of enterprise risk management (ERM) programs in organizations and introduces the concept of "active" risk management. Risk management should go beyond simple monitoring or compliance, and this article provides insights on how to achieve this.

Our third and final article, "Exposure Measures for Pricing and Analyzing the Risks in Cyber Insurance," is a short note that



sets the stage for the paper that the Casualty Actuarial Society (CAS) Research Group recently published on the CAS website. Cyber risk is a major concern for many of us working in the ERM space. With all the different facets that this risk can take, having a solid exposure base is key. The paper, therefore, makes recommendations regarding possible exposure measures.

As usual, a list of recent articles and papers that may be of interest to our members concludes the newsletter. These pieces can provide further information on a broad range of topics, including climate change and the direction ERM might be taking in companies and within the industry.

This issue of the newsletter would not have been possible without the contributions of David Schraub, Julia Anderson Bauer and Katherine Pickett. Thank you all.

Hope you enjoy the reading! ■



Florian Richard, FCAS, is in charge of risk management at AXA XL Reinsurance. He can be reached at [florian.richard@axa.com](mailto:florian.richard@axa.com).



# A Handful of Economic Capital Model Observations

By David M. Walczak

The construction and use of economic capital (EC) models in the U.S. have certainly moved forward since the models were first propagated around the mid-2000s. The main drivers of implementation were companies with European parents but also larger companies that recognized the usefulness of such a tool in presenting a better Own Risk and Solvency Assessment (ORSA) report. More recently, rating agencies have upped the ante on the risk management parts of their assessment of a company, partly in response to the financial crisis outcomes. So what are some of the observations that have come about as companies and consultancies have become more comfortable with repeatable EC exercises? Let's first note that these are just personal observations in working with these models. The consultancies rarely let the industry down when it comes to designing and implementing surveys for studying implementation methods and assumptions or generating commentary on results that have been generated. There are some very good (and mostly granular) surveys on EC available with a web search or a phone call to your favorite industry contact.

What could you argue were the goals of EC implementation, beyond the preceding comments? Many implementers also got into the exercise because of the need for better capital allocation, risk-adjusted performance measures and strategic planning. It certainly also seems that once the computing abilities needed for high-powered projections (including "stochastic on stochastic") became available, the applications to use that power were waiting. Video gaming is another great example of this one; some of today's gamers are controlling characters that look more realistic than some old TVs. Finally, implementing economic capital at its extremes results in either (a) insufficient capital levels, which put the company at undue risk; or (b) too much capital held for risk, which drives up cost of capital allocation to product and renders possible noncompetitiveness.

Since implementation, some of the emerging goals to improve the high-level process have included the following:

- **Risk aggregation improvement.** The past 10 years have seen little improvement on setting a gold standard for the questions of (1) whether to use a copula construct or not and, (2) if yes, what the optimal type of copula construct is for a given company's basket of risk.
- **Communication and understanding of results and restriking assumptions.** It is paramount to have a senior management champion who understands the reports generated from EC exercises. Some of the reports generated by the process can resemble an encyclopedia and aren't always clear on conclusion. Showing a range of results on page 277 can be frustrating unless the reader is led by the hand.

It is paramount to have a senior management champion who understands the reports generated from EC exercises.

- **Control and governance environment.** There is no consensus on where ownership of the model should live after development. The biggest insurers and banks will develop big models in an IT-driven group and then govern the ongoing updates for reuse of the model. Many other companies will treat an EC model like a cash flow testing (CFT) model and allow the modules to live in product and corporate areas as appropriate. It is clear, however, that a framework this complex should be considered a lever to push control and governance forward.
- **Tactical and strategic use of the model.** This category considers the possible use of results to drive product mix, reinsurance or hedging. The model results just don't validate well enough to reality to function well in this regard. On one hand, this makes sense from the standpoint of spending 90 percent of validation activity in the "bad tails" of the marginal and aggregated distributions and then attempting to use the model for outcomes much closer to the mean, or a single standard deviation.

On the other hand, some of the emerging goals to improve the granular parts of the process follow here. It is important to point out that, like CFT, the modeler has the choice of using either a real-world or a risk-neutral construct. Because probability weighting of risk-neutral results can be ambiguous and lead to nonsensical-looking intermediate results, modelers have almost universally chosen real-world assumption sets for CFT and EC modeling. One of the



downsides of the real-world construct is the introduction of unchecked subjectivity, almost always used to the company’s advantage. For example, in a CFT model with corporate bonds, most companies create immediate value at time zero by assuming future assumed default levels insufficient to balance out the extra spread received above risk free. In an EC model, there is really nothing stopping the modeler from assuming a convenient distribution to reverse engineer a result that fits expectations. Like the bond defaults, there is no “magic validation bullet” to solve this conundrum.

- Model equation.** This is simply a mathematical statement of what the model is providing. It is the highest-level “top-down” driver of what is being pursued as a result. Subjective choices of both aggregation and marginal loss distributions may or may not be roped into the equation description. In addition, the projection horizon (usually one year), runoff method use or not, and severity (e.g., 1 in 200 year, 2,000 year, other) are not necessarily standardized. Understanding the need to define the model equation up front and tailoring the definition to possible uses doesn’t always happen.
- Making and validating assumptions.** In addition to the aggregation of risk challenge already mentioned, some of the methods of judging “best fit” for aggregated results can involve eyeballing the results, hence more room for subjectivity. Most key, however, is the subjectivity involved in developing a marginal single-factor loss assumption. For instance, a “1 in 200 year” mortality assumption could lead the actuary to an influenza case, which is a workable example but may not be realistic based on today’s medical science advances.

Let’s use the following example, which is subjective by necessity: “The severe case making up the tail is x percent of the influenza epidemic case.” The rest of the distribution is credible enough to validate. The tail is the key metric and yet it is the most subjective point in the marginal

distribution and produces the biggest difference from a similar and “credible up to 95th percentile” distribution. Again, the need to standardize to produce comparable results raises its head (Table 1).

Table 1  
Volatility of Loss in the Tail of Possible Distributions

Percentile	Mean	90.0%	95.0%	99.5%
Distribution A	-26.0	-32.0	-47.0	-76.0
Distribution B	-26.0	-32.5	-47.3	-69.0
Value difference	0.0	-0.5	-0.3	7.0
Percentage difference	0.00%	1.56%	0.64%	-9.21%

- Untapped risk management uses.** There are so few holistic-type models available to insurers that pushing the EC framework toward more credible applications is a big goal. It would be great to use the framework for calculating capital needed to meet capital ratios at a 95 percent level. Or to fulfill liability cash flows and/or fixed income payments at a 90 percent level. Most would agree that a company planning model or CFT model is not robust (or granular) enough to answer these questions. This raises a question that we’ve seen before: Can we trust an EC model at the 90 percent level to a considerably higher degree than at the troublesome tail risk levels previously noted?

Because of the unique possible power of an economic capital model, we should expect to see notable improvements over the next 10 years. But without further standardization, don’t be surprised to see the subjectivity-related issues still here as well. ■



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# A Gigantic Risk Management Entertainment System

By Dave Ingram

*Editor's note: This article was first published by Willis Towers Watson. It is reprinted with permission.*

**A**s video gaming has become more and more sophisticated, and as the hardware to support those games has become capable of playing movies and other media, video game consoles have become “entertainment systems.”

An entertainment system is a very capable computer system and often allows groups of people to use the system together. Nobody expects any tangible benefit from an entertainment system. It simply provides a way to enjoy nonproductive time. That is what it is designed for.

But have you noticed that in some firms, the risk management system comes close to being an entertainment system? A typical picture of a risk management system focuses on risk appetite, identifying and assessing risks, risk measurement, monitoring risks, risk reports, risk committee meetings, stress and scenario

testing. People spend hours and hours making tiny (and sometimes major) adjustments to the system, then peering at and discussing the output. Does that list sound familiar?

Go back now and read the list again. Not a single item on that list is an action step. Quite a number of people can be very busy doing the tasks listed above without there being any direct connection to the decisions that drive the work and ultimately the risk profile of an organization.

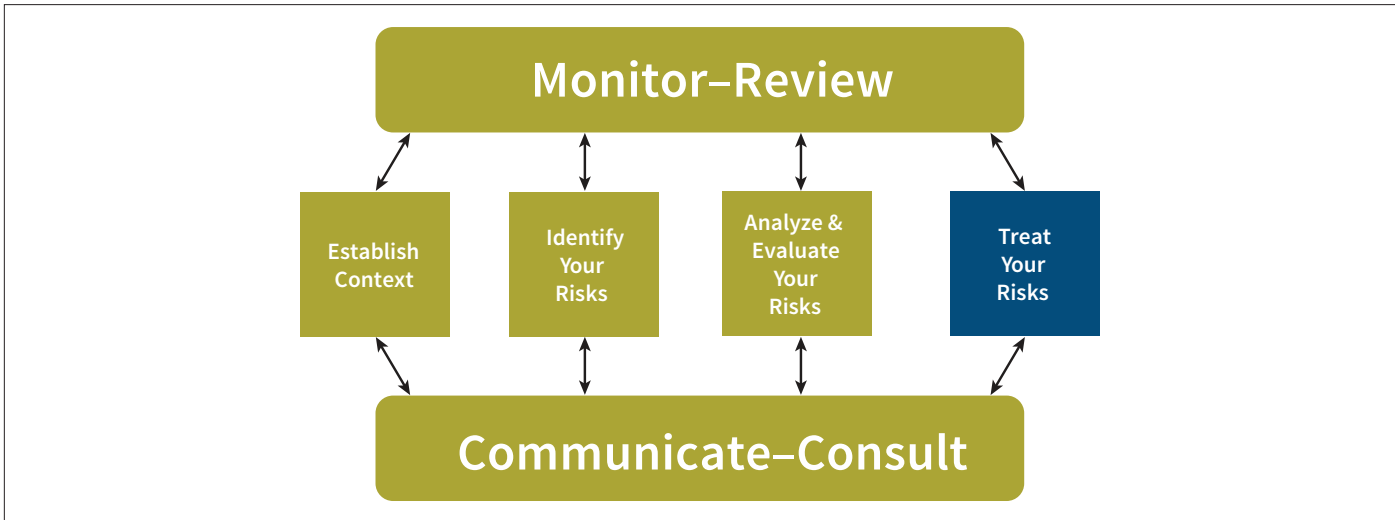
In many organizations, that is the path of least resistance for developers of a new ERM program: Stay away from action and stick to risk “entertainment.” Often managers bring this information to their boards and communicate about all of this “activity” to the board.

When asked what happens when there is a problem indicated by the risk system, some of these firms would say that when a problem is found, they put it on the agenda for the next risk committee meeting, which may well recommend that a study be performed and the study would be reviewed at the next committee meeting.

The committee might then decide to move that risk to the top of the next report into the highlighted section of the report, where it will stay until the situation is resolved. With the passage of time, and with executive management mostly unaware of the risk entertainment system, many of these situations resolve. Many via the process described, as “time heals all wounds.”

The flow chart depicts a risk management system that a company adopted after reading the ISO 31000 Risk Management Standard (Figure 1).

Figure 1  
Flow Chart Depicting a Risk Management System







There are six parts of this risk management system. But five of the six parts are inactive and internal to the risk management system: Establish Context, Identify Risks, Analyze and Evaluate Risks, Monitor and Review, Communicate and Consult. Those five are all talk and *zero* action. Only Treat Your Risks requires an action that changes anything outside of the risk management process.

But a risk manager could easily decide to skip treating risks and claim to be more than 80 percent in compliance with the standard. They would have developed nothing but a risk management entertainment system without an active risk management process. Good discussions and insightful reports, but no actions.

Implementing active risk management will not be an easy transition for an organization; it adds additional explicit risk considerations to strategic decision-making. New strategies will not be adopted without making realistic plans for risk treatment.

It also adds concerns about the day-to-day decisions made by business managers that might lead to excessive concentrations of risk. By focusing on return on risk, active risk management may conflict with the prevailing view of the corporate winners and losers leading to requirements for changes to the practices of last year's winners that will detract from their aura of success.

Active risk management is the only kind of risk management that is worth paying for. It's the only risk management approach that produces any results; a risk management process that will be much more productive than an entertainment system. ■



Dave Ingram, FSA, CERA, FRM, PRM, MAAA, is executive vice president, Willis Re, Willis Towers Watson. He can be reached at [dave.ingram@willistowerswatson.com](mailto:dave.ingram@willistowerswatson.com).



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# Exposure Measures for Pricing and Analyzing the Risks in Cyber Insurance

By Brian Fannin

*Editor's note: This article is adapted from the executive summary to the Casualty Actuarial Society (CAS) report Exposure Measures for Pricing and Analyzing the Risks in Cyber Insurance. Research material can be found on the [CAS website](#).*

The ubiquity of cyber risk and the sober attention it has garnered from our industry has been self-evident for a number of years. There is an awareness of the sums at risk and the new threats that our policyholders are exposed to. However, the conversation often overlooks the most basic of insurance questions: What exposure base makes the most sense for assessing the risk? For exposures like property or auto, that is a question with a clear answer. But for cyber, the science is not yet settled. To explore that question, the CAS has engaged Michael A. Bean, who is the managing director of modeling and mortgage insurance, Capital Division, Office of the Superintendent of Financial Institutions.

Bean's report identifies and makes recommendations regarding possible exposure measures for pricing and analyzing the risks



in cyber insurance. Cyber insurance is an insurance product that is designed to provide protection against the financial consequences of a failure or compromise of an organization's information system as a result of a cyber event. A cyber event is an event that compromises the availability, integrity or confidentiality of an organization's information system or electronic data in some way. Examples of cyber events are a cyberattack on an information system or the unintentional disclosure of electronic medical records due to human error.

Cyber insurance has been available in various forms since the 1990s but is still a relatively new product and continues to evolve.

Cyber insurance has been available in various forms since the 1990s but is still a relatively new product and continues to evolve. Most carriers of cyber insurance offer a core set of coverages, either as a package or as part of a modular policy, as well as a number of supplementary coverages, which can vary from one carrier to another. Core coverages include the following:

- privacy liability,
- network security liability,
- cyber event response,
- network interruption,
- recovery and restoration of digital assets,
- regulatory actions,
- fines and penalties, and
- payment card industry assessments.

Supplementary coverages include these areas:

- cyber extortion,
- cybercrime,
- media content liability,
- technology errors and omissions, and
- bodily injury and property damage that results directly or indirectly from a cyber event.

The report uses a conceptual rather than an empirical approach to identify and evaluate potential exposure measures for cyber insurance. In particular, it considers the losses that can arise with each cyber insurance coverage, identifies potential exposure measures that are related to these losses, and then evaluates these potential exposure measures based on a set of criteria.



- stability over the period of insurance coverage, and
- extent to which the candidate measure can legally be determined and shared with insurers or other third parties without violating privacy laws or regulatory requirements.

An empirical approach to identifying and evaluating potential exposure measures is not feasible due to the current scarcity of reliable, representative and publicly available loss experience for cyber insurance.

Although we cannot say that the research provides definitive conclusions for every situation one might encounter, we hope that we can highlight the most fundamental element of pricing any insurance product: What exposure base makes the most sense for the risk? ■

The following criteria are used to evaluate potential exposure measures:

- ease of calculation,
- ability to audit the calculation,
- strength of relationship to losses,



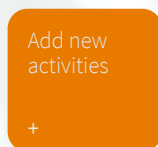
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# Recent Publications in Risk Management

**A**s an ongoing feature in *Risk Management*, we provide recent publications we find noteworthy to our readers. Please send suggestions for other publications you find worth reading to *David Schraub* or *Florian Richard*.

Building ERM Buy-In

**SOA**

<https://theactuarymagazine.org/building-erm-buy-in/>

Risk Around the Industry

**SOA**

<https://theactuarymagazine.org/risk-around-the-industry/>

Force of Nature

**SOA**

<https://theactuarymagazine.org/force-of-nature/>

Risk is Opportunity

**SOA**

<https://theactuarymagazine.org/risk-opportunity/>

Hungry for Risk?

**SOA**

<https://theactuarymagazine.org/hungry-for-risk/>

Upgrading an Existing Capital Model—  
A Common Risk Driver Application

**CAS**

[https://www.casact.org/pubs/forum/19spforum/03\\_PAinCapMWP\\_Rptl.pdf](https://www.casact.org/pubs/forum/19spforum/03_PAinCapMWP_Rptl.pdf)

7 Factors That Could Drive Enterprise Risk Management in 2030

**Willis Towers Watson**

<https://www.willistowerswatson.com/en-US/Insights/2019/07/seven-factors-that-could-drive-enterprise-risk-management-in-2030>

Is ERM Worth the Cost?

**Risk & Insurance**

<https://riskandinsurance.com/erm-should-you-make-the-expenditure/>

Liquidity Risk Management: An Area of Increased Focus for Insurers

**Milliman**

[http://assets.milliman.com/ektron/Liquidity\\_risk\\_management\\_An\\_area\\_of\\_increased\\_focus\\_for\\_insurers.pdf](http://assets.milliman.com/ektron/Liquidity_risk_management_An_area_of_increased_focus_for_insurers.pdf)

Enterprise Risk Management, Long Used by Companies,  
Takes Hold in Government

**The Wall Street Journal**

<https://www.wsj.com/articles/enterprise-risk-management-long-used-by-companies-takes-hold-in-government-11564392604>

10 Risks Becoming More Severe Due to Climate Change

**Risk & Insurance**

<https://riskandinsurance.com/10-risks-becoming-more-severe-due-to-climate-change/> ■







# *Enterprise Risk Management 2019: The New Wave of Risks*

Explore the emerging topics taking centre stage in today's world of enterprise risk management. Read our publication and listen to the authors at [cia-ica.ca/erm](http://cia-ica.ca/erm).



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