

Risk Management

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SECTION



Risk Appetite: An Axiomatic Approach

By Damon Levine

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Risk Management

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Chairperson's Corner

By Tom Weist

To all of the devoted *Risk Management* readers, I hope 2017 is off to a good start. As I began writing this Chairperson's Corner, I contemplated various risk topics to write about for the initial article of the New Year. The first thing that came to mind was actually on a personal note. My girls love their trampoline, but it makes me nervous. We have all read numerous stories related to injuries in these huge backyard toys. And trampolines usually made the list in discussions with colleagues on the risks in homeowners insurance. Well, between the time when I started and ended this article, my oldest daughter landed in the ER from a wrong move in a triple flippity-do. Funny thing is that it happened in the gym with coaches present on the cushy mats, not in the unsupervised trampoline. I guess unfortunate events can happen anywhere, even with risk mitigation.

Unfortunate events can happen anywhere, even with risk mitigation.

Moving on from my backyard dangers, I don't need to look far to see the gloom and doom around me. Two historic events, Brexit and the Trump inauguration, will undoubtedly have large impacts to the insurance industry. The P&C industry is in the softest pricing market in decades. Climate change seems to be contributing to a higher frequency of extreme events year after year. Throw in the excess capital in reinsurance and you have the ingredients for a tough year (or two or three ...).

President Trump has various proposals that will impact insurance. Repealing the ACA without having a replacement ready could create serious confusion and chaos for A&H insurers. By the time you read this, Trump will have been in office for a couple of months. I am hopeful that we have a clearer picture of the future of health care.

Brexit will eventually get moving along. Teresa May officially needs approval from parliament for invoking article 50 and

beginning to withdraw from the EU. The vote is due by the end of March. Will it be a difficult transition? What will a future London look like? Based on the tone coming from some EU countries, it doesn't seem like Britain will get to have their cake and eat it too. There will be some impact to our industry. How much? We will have to wait and see. The process will be slow and we can look forward to the next two years of watching this play out.

On a positive note for U.S. insurers, there is the potential that interest rates rise and taxes are lowered. Both should be beneficial to our domestic industry. Depending upon where you are sitting however, the opposite may be true for insurers outside the U.S. where interest rates may remain negative and lowered U.S. taxes would level the playing field. Another possible improvement from a business perspective is having Republican majorities in both chambers of the U.S. Congress. This is generally a positive for the future judicial environment, and in turn insurance enterprises. Perhaps for 2017 we need to plan for the worst and hope for the best as the saying goes.

While we plan (and/or hope) for 2017, the JRMS is pushing our goals forward for the year. At the top of the list, we are gearing up for the ERM Symposium. We have a revised format, a host of new speakers and will be located in New Orleans for the first time. Next, we have an RFP for a Risk Game underway. This will add an exciting twist to various meetings in the future. Moderators and presenters are being recruited for ERM presentations at the SOA Life & Annuity and Health meetings as well as the CAS Spring meeting. Our Risk Management E-Library will be expanded with new literature and re-introduced to our members. In addition, we have research being done on Negative Interest Rates, Country Risk Officer, Application of ERM National Long-Term Care Needs and Parameter Uncertainty. Finally, be on the lookout for networking events sponsored by the JRMS. These gatherings give you a chance to catch up with current members and help recruit new, like-minded individuals to participate in advancing risk management.

My best wishes for a prosperous 2017 and I look forward to meeting many of you through the various conferences and activities of the JRMS. ■



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Editor's Note

By Baoyan Liu (Cheryl)

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair ..."

—A Tale of Two Cities, Charles Dickens, 1859

I begin this "Editor's Note" by applying one of the great opening sentences of any novel to the current economic and political situation. The year 2016 saw a sea change in politics, first the shock of Brexit passing then President Trump's victory. "Black Swan" might be the word that you heard the most in risk management these months. If you recall, in the first 2016 issue of *Risk Management*, we included an article on preparing for the unthinkable—"Black Swans and Risk Management." Most companies started the Black Swan evaluation as part of their emerging risk management. The article also discussed how companies can both address the unknown and, at the same time, ensure they are agile enough to react when the seemingly unthinkable occurs. Into 2017, I agree with Warren Buffett that risks of being out of the market are huge compared to the risks of being in it.

In this first issue of *Risk Management* in 2017, we'd like to share with readers articles from various angles of the risk spectrum.

Though most ERM practitioners agree on the importance of a risk appetite framework (RAF), there is less alignment on its critical goals, implementation, and even relevant terminology. In "Risk Appetite: An Axiomatic Approach," Damon Levine avoids debate regarding terminology and, instead, illustrates a RAF with those elements most often regarded as best practice.

We also provide insights on international capital requirement. The International Association of Insurance Supervisors (IAIS) has moved one step closer to the release of its capital standards for Internationally Active Insurance Groups (IAIGs). While these standards are meant to apply on a group basis and not to individual legal entities, there is often a trickle-down effect so all practitioners need to be aware of what is transpiring. Tom Herget gives us an update on the development of this standard. He outlines the concepts and features that actuaries need to deal with, as well as key areas still to be addressed and timetable ahead. In addition, we are pleased to include an abbreviated version of the "International ORSA Regulatory Requirements Chart"

from the International Actuarial Association. In this issue, the content of this International ORSA Regulatory Requirements Chart has a focus on U.S., Canada, Europe and Bermuda.

What is the role of a CRO? How do CROs lead insurers forward on the ERM journey? Ernst and Young has run an annual survey of Chief Risk Officers (CROs) since 2010. Over the period, the survey has charted the evolving role and authority of insurance CROs, as well as the development of ERM capabilities. We have an article in this issue with selected highlights of key outputs through four of the key themes of the survey: maturation of risk management; CRO roles, responsibilities and reporting lines; ORSA — one year in; and risk appetite.

Economic Capital (EC) framework has been commonly used to quantify risk and capital. As a common practice, the final step in calculating EC is risk aggregation. The presumption is that the EC required for an enterprise is less than the sum of the individual risk exposures due to diversification benefits. Instead, in "Risk Aggregation and Risk Magnification," Feng Sun provides evidences of the opposite of risk diversification (or risk magnification), and discusses a potential change of the way insurance companies quantify and manage the risks.

In this issue, we continue the cyber risk discussion, and share with readers an article on "The Complications of Cyber Risk Quantification." For corporate management and their boards, cyber threats and their costs are a continuously evolving, moving target and a source of uncertainty. While the need for robust security is self-evident and attracting significant investment dollars, demand is building for insurance products that can provide an important risk management backstop.

Last, based on a recent survey of our section's membership, our members indicated that they want to know more about the section's e-library and its contents. Here in this issue, some useful information about the JRMS e-Library is included. And as usual, we provide a list of recent articles and papers that may be of interest to our members. These pieces can provide further information on a broad range of topics.

We would like to give a special thank you to David Schraub and Kathryn Baker for helping us pull together this March newsletter.

Happy New Year and Wish you a good year in 2017! Enjoy reading! ■



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Risk Appetite: An Axiomatic Approach

By Damon Levine

Though most enterprise risk management (ERM) practitioners agree on the importance of a risk appetite framework (RAF), there is less alignment on its critical goals, implementation, and even relevant terminology.

This article avoids debate regarding terminology and, instead, illustrates a RAF with those elements most often regarded as best practice. As a motivation for the approach, a set of statements about preferred goals and methods will be taken to be true. These “axioms” will serve as a compass in our search for the ideal RAF and are as follows:

- A RAF includes *enterprise level* statements describing the preferred types and amounts of risk the company is willing to assume in pursuit of its business objectives.
- The above statements include limits, targets, tolerances, or constraints (collectively “limits” and/or “tolerances”) relating to key profit, value, and solvency measures and relating to each high-level risk category in the risk taxonomy (e.g., risks categorized as financial, market, legal/regulatory, insurance, strategic, and operational).
- When appropriate, there are *line of business* (LOB) level statements to support the enterprise level statements.
- There exists a monitoring and reporting structure to measure actual exposures against the system of limits and tolerances at both the business unit and enterprise levels, detect/report any breaches, and trigger appropriate remediation.
- When feasible, quantitative methods are employed because they are objectively defined, leave less chance for misinterpretation, and aid in making the RAF operational.¹ An enterprise risk model capturing LOB correlations and interrelationships is necessary and we assume such a model is in place and can model prescribed scenarios or be run stochastically.

The financial planning process (the Plan) will drive the setting of certain limits and tolerances. In some cases, LOB level statements help set enterprise level statements. Such a bottom-up approach can be very effective; the term “cascading” should

not force a preference for only top-down thinking or a specific logical sequence. LOB level constraints and the Plan process must play a central role in limit setting. This creates buy-in and avoids the creation of a RAF resulting in immediate and widespread non-compliance.

Other important elements include clear descriptions of roles and responsibilities, learning mechanisms, and the ability to review the RAF and evolve as needed. For concreteness, we use a hypothetical multi-line insurance company (the Company or We) to create our RAF.

LIMITS AND TOLERANCES AT THE ENTERPRISE LEVEL

The Board of Directors (the Board) and the Company’s executive management (Management) agree on risk appetite statements for earnings, capital, and a measure of franchise value. Analysis of the Company’s risk profile will help ensure that compliance with any proposed risk appetite statements is reasonable and attainable.

Risk appetite statements (denoted with “M” for *metric*) of the following form are desired:

- M_1 : We are $x\%$ confident that the Plan (GAAP) earnings for the Company will not be missed by more than 15%; i.e., the estimated probability of achieving at least 85% of Plan earnings is $x\%$.
- M_2 : We are 85% confident that the Company’s achieved return on equity (ROE) $\geq y\%$.
- M_3 : The aggregate capital at the legal entities and the holding company is sufficient to cover all obligations and expenses, over a one year horizon, in any modeled scenario having greater than a 1 in 200 annual probability.
- M_4 : The annual probability of a reduction in franchise value (e.g., present value of free cash flows) of 10% or more is at most $z\%$.

The values of x , y , and z are yet to be determined. In pursuit of its business objectives, the Company’s risk exposure preferences—in decreasing order—are insurance, strategic, market, legal/regulatory, and operational. This leads to the following risk appetite statements (denoted with “R” for *risk* type) which leverage the Company’s modeling of (hypothetical) risk scenarios:

- R_1 : For insurance risk scenarios with probability of at least 10% (“ $p \geq .10$ ”), the worst impact to earnings is at most $I_1\%$ of Plan.
- R_2 : For strategic risk scenarios with $p \geq .10$, the worst impact to earnings is at most $I_2\%$ of Plan.
- R_3 : For market risk scenarios with $p \geq .10$, the worst impact to earnings is at most $I_3\%$ of Plan.

- R_4 : For legal/regulatory risk scenarios with $p \geq .10$, the worst impact to earnings is at most $I_4\%$ of Plan.
- R_5 : For operational risk scenarios with $p \geq .10$, the worst impact to earnings is at most $I_5\%$ of Plan.

The Company uses the Plan process and the risk inventory to parameterize I_1 – I_5 .

USE OF THE PLAN PROCESS IN THE SETTING OF LIMITS/TOLERANCES

Recall statement M_1 : We are $x\%$ confident that Plan earnings for the Company will not be missed by more than 15%.

Ensuring this statement will be a central theme of the Plan process and we require that LOB forecasts have a degree of confidence. For each LOB, denoted LOB_1, LOB_2, \dots the respective (dollar) earnings forecasts P_1, P_2, \dots are such that:

LOB_x is 95% confident that it will not miss its Plan forecast by more than $M\%$ of P_x .

The use of a single value for M across the board reflects the view that a LOB with a higher expected (dollar level of) earnings should be permitted to have a larger potential dollar shortfall. The Plan process and the risk model use an iterative approach to determine the LOB forecasts P_1, P_2, \dots and the value of M .

The Company examines a value of $M = 15\%$ but model simulation shows this tolerance at the LOBs only leads to the *enterprise level statement*:

“We are 86% confident that the Plan earnings for the Company will not be missed by more than 15%.”

The Company prefers to have a 90% confidence level for this statement. To “bump up” the 86% confidence to the desired 90% confidence we must tighten the earnings tolerance in each LOB. We gradually try smaller values of M such as 14%, 13%, etc., until we find what value gives the desired confidence at the enterprise level.

The Company eventually finds that 12% will produce the desired enterprise statement. However, it is necessary for one LOB to reduce its Plan forecast so that it can commit to its earnings confidence statement. This revision in the Plan forecast illustrates the iterative nature of the Plan/limit setting process. The fact that the limit setting is embedded in the Plan process creates a strong link between strategic planning and ERM while increasing buy-in. The Company has therefore determined the value for M as 12% and we have:

If:

Each LOB is 95% confident that it will not miss its own Plan earnings by more than 12%,

Then:

M_1 : We are 90% confident that Plan earnings for the Company will not be missed by more than 15%.

The risk model, complete with equity modeling, can then be used to translate the LOB limits for earnings into LOB limits for ROE. The model is then used to determine what statement is implied at the enterprise level and results in a value of y of 12% in statement M_2 . The finalized Plan, current risk inventory, and the model allow the parameter z , in statement M_4 , to be determined as 5%.

Strategy discussion and the Plan process lead to revisions to the risk inventory/mitigations, which suggest the following parameters are attainable for statements R_1 – R_5 : $I_1 = 6\%$, $I_2 = 4\%$, $I_3 = 2.5\%$, $I_4 = 2\%$, and $I_5 = 1.5\%$. Note that R_1 – R_5 help ensure the goal of statement M_1 though there is not a precise mathematical linkage. For example, if simultaneous events materialize in several of the risk classes, at impact values near those defined by I_1 – I_6 , their aggregate effect on earnings may well be less than 15% if there is not significant adverse interaction.

The statements M_3, M_4 , and R_1 – R_5 are not cascaded to the LOBs in any manner.

Regarding M_3 , the risk model is used to determine the aggregate capital need, C , at the 99.5% confidence level to determine the (positive) risk buffer amount, to be held at the holding company, as the maximum of $\{0, C - \text{total capital at operating companies}\}$.²

MONITORING AND REPORTING FOR THE RAF

The fourth axiom stresses the importance for a formal monitoring and reporting system which measures actual exposures against the system of limits and tolerances at both the LOB and enterprise levels.

On at least a quarterly basis, the enterprise risk inventory is updated and the following risks and metrics are tracked, measured or assessed:

1. LOB level earnings to date and any shortfalls versus the LOB Plan forecasts
2. Achieved ROEs to date and any shortfalls versus the LOB Plan forecasts
3. The enterprise values for (1) and (2)
4. Projections reflecting (1)–(3) for the Plan time horizon and updated risks to that “reforecast” (reflected in the risk inventory)
5. The enterprise risk inventory and risk model are used to check a) the aggregate capital and risk buffer needs, and b) the annual probability of a reduction in franchise value of 10% or more

6. Separately and for each risk type, the risk scenarios with probability of at least 10% are identified and their impacts to LOB and enterprise earnings are estimated
7. Customized for each LOB, a) key risk indicators (KRIs) and key performance indicators (KPIs) relating to the metrics in M_1 – M_4 , and b) KRIs relating to specific sub-classes of the high-level risk categories used in R_1 – R_5 . This is a form of cascading, to the LOBs, of the statements R_1 – R_5 .

Some of the quantities tracked in (7a) include drivers of earnings such as market penetration, sales levels, loss ratio, expense ratio, client and customer satisfaction, economic indicators, and reserve/capital projections.

In (7b) the Company makes use of metrics relating to granular risk types (falling underneath the main categories of R1–R5) such as adverse claims development, FX exposure, changes in distribution channels, business continuity preparedness measures, project status, IT systems implementation status, gain/loss of clients, cash on hand, portfolio duration, number of data loss incidents, current litigation docket, actual to targeted capital levels, and regulatory changes or ongoing examinations. The quantities described in (7) should, to the extent possible, be forward-looking risk measures rather than trailing indicators.

The ERM function works with the Company’s subject matter experts to define a system of “traffic light indicators” which translate the observed numerical values in 1–7 above to Green, Amber, or Red (on the LOB and enterprise levels) and have the following meanings and triggered actions:

Green: the risk level is acceptable and regular monitoring continues (no special action required).

Amber: the risk may be at a level that is not acceptable and may require remediation; escalation (formal/documented reporting of the situation) is required to the ERM Committee (ERMC), who will make a formal recommendation for corrective action, to restore to Green rating, or possibly defer a decision regarding action during a period of continued monitoring.

Red: the risk has exceeded the allowable tolerance or limit, and escalation to the ERMC, Management, and/or the Board is required. Root cause analysis, describing the origin of the breach, is submitted by the relevant business and a path toward remediation, including time-frame, is set forth by the ERMC.

FINAL THOUGHTS

A RAF is rarely static and should be reviewed annually, when a breach occurs, or in the event of any significant change in the organization’s risk profile.

The axioms described in this article leave room for a company to customize the RAF’s key elements, including the metrics, the reporting/measuring process, and governance.

The Company’s RAF design helps ensure the following core principles described by the North American CRO Council.³

- Establishing a comprehensive RAF should be approached in an iterative fashion.
- The RAF should reflect the “diverse interests of parties relevant in achieving company objectives.”
- Compliance with the frameworks limits/tolerances should be realistic and attainable.
- The RAF should “identify and quantify risk preferences for material risks.”
- Risk appetite statements and limits should be reviewed and possibly revised after significant events—and at least annually—by the Board.

It is also important to keep in mind that ERM in general—and limit/tolerance reporting in particular—is about *risk* and this implies *future* events must be the primary focus. Event databases are important but ERM must detect and communicate exposure to future events. As a result, limits and tolerances should make extensive use of risk identification and quantification processes so that the RAF can function, in part, as an early warning system rather than merely pointing to recent downside events.

A RAF, while only one component of a complete ERM framework, offers a chance for a clear link with strategy and can enable a company to “live and breathe” its risk-reward vision. ■



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ENDNOTES

- 1 This statement and some of the other axioms are influenced by the paper “Developing the Risk Appetite Framework of a Life Insurance Business” from the Institute of Australian Actuaries.
- 2 Many insurance companies will also define target capital levels at their legal entities to help ensure a desired rating from S&P, AM Best, etc.
- 3 See the paper “Establishing and Embedding Risk Appetite: Practitioners’ View” from the CRO Forum and the North American CRO Council.

Risk Aggregation and Risk Magnification

By Feng Sun

Economic Capital (EC) framework has been commonly used to quantify risk and capital. As a common practice, the final step in calculating EC is risk aggregation. The presumption is that the EC required for an enterprise is less than the sum of the individual risk exposures due to diversification benefits.

The concept of diversification is well known and used in the financial service industry. It has become an effective investment optimization and risk management tool. Investors or risk managers believe that less than perfect correlated investment instruments or risk factors can mitigate the risks and boost overall returns.

This article will focus on risk management, provide evidence of the opposite of risk diversification (or risk magnification), and discuss a potential change to the way insurance companies quantify and manage the risks.

CURRENT INDUSTRY PRACTICE

In an ideal world, this aggregation process is unnecessary by definition—as long as the distribution of the outcome by all risk factors is obtained, the tail risk measures can be calculated accordingly.

However, to obtain the distribution is difficult or even non-practical because of a lack of the following:

- An integrated stochastic scenarios generator that simulates a series of stochastic scenarios that reflects the joint distribution of multiple risk factors, where the relationships amongst the risk factors are integrated.
- A comprehensive financial projection model that is capable of capturing the true impacts of the risk factors and their

One risk is magnified as another risk factor is introduced.



interactions. It is capable of taking these scenarios as well as other financial and actuarial assumptions as inputs and calculates the financial impact on the scenario by scenario basis to obtain the distribution of impact by the joint risk drivers.

This ideal approach is the so-called integrated approach in EC literatures. It is ideal because stochastic scenarios reflect the natural relationships amongst the risk drivers via scenario file creation process and the resulting financial impact reflects diversification benefits by comprehensive projection model or reflecting the true risk factor interaction mechanism.

However, it is a complicated process, which poses a number of challenges. It not only needs a scenario generator—which requires a deep understanding of the risk factors and their relationships—but also needs a sophisticated actuarial model. The model can project assets, liability and their interaction at enterprise level. The model may also need to reflect the company's day-to-day risk management practice (such as Assets and Liability Management (ALM), or hedging) and discretionary management actions under stress such as adjustment on credit rating or cost of insurance charge for Universal Life.

Due to the methodological and technical challenges, the integrated approach has not been commonly seen in the industry, especially for large companies with multiple lines of business. Rather, the risk aggregation approach dominates as this paper is written.

There are a few ways of doing that, from simplest to more sophisticated ones.

- Sum of each individual EC—assuming there is no diversification across risk factors.
- Applying predefined diversification benefit factor (or percentage) to the sum—applying the diversification at enterprise level, not at risk factor level.
- Using simple correlation matrix—diversification amongst risk factors is considered, but stays the same across the distribution of risk factors.
- Using correlation matrix with Copula—diversification amongst risk factors is considered and its effect varies by distribution or the degree of stresses.

Amongst these methods, the simple correlation matrix method is most common. Under this method, economic capital is calculated for each individual risk factor at the predefined confidence level, and then aggregated by multiplying the economic capital results through a correlation matrix.

By applying a correlation matrix, the required EC at enterprise level is reduced from less perfect correlation between risks, or the probability of the extreme events occurring simultaneously is lower than the probability of each one occurring individually. In other words, the worst case scenario for all individual risks does not happen at the same time. The diversification benefits are determined by the correlation matrix, which reflects the company's judgements on the relationships amongst the risk factors.

Although commonly used, we will provide a few examples in this article to show that this method may not always work for risk aggregation.

A RISK MAGNIFICATION EXAMPLE

Single Premium Immediate Annuity (SPIA) is a simple, but popular insurance product in U.S. and around the world, designed to address the financial needs for retirement. The SPIA policyholders pay a single premium in exchange for periodic benefit payments starting at issuance of the policies and last for a lifetime. The payment amount is determined at issue and usually fixed, or sometimes with inflation-index attached.

This product has two primary risk elements from insurance carrier's perspective. Namely, interest rate risk and longevity risk. The insurer incurs a more than expected loss either under the prolonged lower interest rate (than pricing) or when people live longer than expected, or both. Lower interest rate puts pressure on investment income, which jeopardizes their ability to make future benefit payments. Longevity risk assumes that policyholders live longer, which requires payments from the insurer. When both happen, the insurer earns less and pays more.

If we take one SPIA policy, and calculate the present value of the annual annuity payment of \$1 under four situations, namely best estimate case (or baseline), interest rate stress, longevity stress and interest rate stress, and longevity stress happen simultaneously, we have the results below.

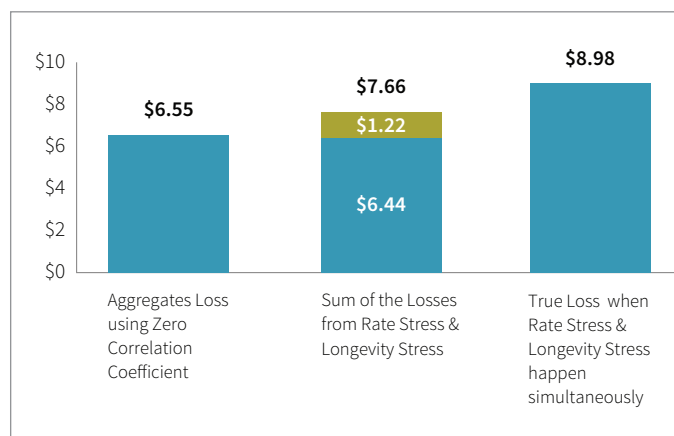
Scenarios	Present Value	Loss under stress from Baseline
Best Estimate Case (baseline)	\$14.88	-
Interest Rate Stress	21.32	6.44
Longevity Stress	16.10	1.22
Interest Rate Stress & Longevity stress	23.86	8.98

If we use correlation matrix method, and assume the correlation coefficient between longevity and interest rate is zero as commonly used in the industry, the resulting aggregated loss is

$$\sqrt{6.44^2 + 1.22^2} = \sqrt{42.96} = \$6.55$$

Figure 1 compares the three types of aggregation results.

Figure 1
Three Types of Aggregation Results



The aggregated loss under correlation matrix method is the smallest and the true loss assuming the two stresses occurring simultaneously is the largest. The sum of the losses, which can also be seen as the perfect correlation between the two risk factors rather than no correlation under this correlation matrix method, is in-between.

This indicates that the correlation matrix method underestimates the true loss, even when assuming perfect correlation between the two risk factors.

This result is intuitive because the longevity risk requires the company to pay more and interest rate risk assumes the company earns less. When the two happen simultaneously, not only is there no risk offset between these risks, but also, there is a magnification effect, where one risk is magnified as another risk factor is introduced.

Another way to interpret this is that the longevity extends the benefit payment period, which not only increases the total amount of loss, but also increases the liability duration, which by definition, makes the liability more sensitive to the interest rate risk.

Another example has to do with an interaction between liquidity risk and lapse risk. An insurance company initially was experiencing some liquidity issues on the investment side, and it was downgraded by the rating agencies subsequently; once the news became public, the policyholders—without much knowledge about how to deal with it or being heavily influenced by their agents—became panicked and decided to get their money back by surrendering their policies. This action exaggerates the liquidity wound. The company was forced to sell their assets for liquidity needs. This downward spiral is another example of risk magnification, where the lapse risk becomes more severe as the liquidity risk is introduced.

THE IMPLICATION

Since there are cases where the impact of one risk factor is magnified as another risk factor is present, the correlation matrix method does not always work for risk aggregation purposes. We need to rethink the way we quantify and manage risks.

A company can perform a reality check and see if the existing correlation matrix is valid or reasonable. Although the integrated

approach is not achievable at enterprise level, the company can use this approach on a small scale to check the relationship of risk factors on a pair by pair basis, and see if there is a diversification effect or magnification effect to validate the existing correlation matrix.

To quantify the magnification effect, the integrated approach is still preferred. If not possible, applying adjustments to approximate the true effect would be viable alternatives.

To manage risks effectively, managing one risk at a time or on standalone basis may no longer be sufficient. The risks need to be managed at enterprise level, where the interactions amongst risk factors need to be considered and managed as well, especially the other risks that have strong ties to the target risk to be managed.

CONCLUSION

When it comes to risk aggregation, it is not always the case that risks would have an offset effect at the tail. Preferably, risk managers can quantify risks using the integrated modeling. If not possible, explore alternative solutions to capture the impact of multiple risk factors as well as their interactions, such as using deterministic scenario analysis to pick up the compounding effects. This way the company is able to not only to manage the individual risk, but also to understand and manage their interactions. ■

The views in this paper represent the author's personal opinions. It does not represent any statements or views of the corporation the author affiliates with.



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The Insurance Capital Standard (ICS) Moves Forward

By Tom Herget

The International Association of Insurance Supervisors (IAIS) has moved one step closer to the release of its capital standards for Internationally Active Insurance Groups (IAIGs). While these standards are meant to apply on a group basis and not to individual legal entities, there is often a trickle-down effect so all practitioners need to be aware of what is transpiring.

The IAIS is the international standard setting body responsible for developing principles, standards and other supporting material for the supervision of the insurance sector and assisting in their implementation. The IAIS is a member of the Financial Stability Board (FSB). The IAIS is routinely called upon by the G20 leaders and other international standard setting bodies for input on insurance issues as well as on issues related to the regulation and supervision of the global financial sector.

To refresh, IAIS supervisory materials are structured in three layers:

- At the bottom, the insurance core principles (ICPs) which are intended for regulation of all licensed insurers in all jurisdictions.
- Atop that, ComFrame provides additional requirements that are meant to apply to all IAIGs. The ICS will be the capital component of ComFrame.
- Atop of that, additional requirements apply to the regulation of all Global Systemically Important Insurers (G-SIIs). This additional capital requirement—in addition to a Basic Capital Requirement (BCR), eventually meant to be the ICS—is called the High Loss Absorbency (HLA).

A few years ago, the IAIS announced a temporary version of the ICS called the Basic Capital Requirement (BCR). It is more formula-driven and will be replaced by the under-development and focus of this article, the ICS.

The ICS is meant to apply to all IAIGs. It is estimated there will be about 50-75 IAIGs, although there are currently no plans to

make the complete number or the list of IAIGs public. The ICS is being developed with significant field testing; over 30 IAIGs from around the globe participated in the latest field test.

FEATURES

Based on the IAIS's 250-question consultation document, actuaries (and his/her peers) who prepare the ICS will have to deal with the following concepts:

- Selecting a Market Adjusted Values (MAV) Balance Sheet or an Adjusted Generally Accepted Accounting Principles Balance Sheet (GAAP+) as starting values
- Understanding GAAP+: Begin with reported values under local GAAP; replace all assumptions with current, entity-specific assumptions; hold present value of cash flows (using a gross premium) as liability (for life companies)
- Getting comfortable with three definitions of contract boundaries—one for US GAAP, one for IFRS and one for ICS
- Developing a Margin Over Current Estimate (MOCE), either sufficient to run off the block or sufficient to transfer to third party, as an additional liability
- Utilizing a discount rate (many options remain)
- Not incorporating Asset Liability Matching (ALM) into the mix
- Targeting 99.5 percent VAR under a one-year time horizon as the calibrated capital requirement
- Preparing to deal with tiered capital in a fashion similar to bank leverage ratio rules
- Looking over the shoulder of an actuary who has performed Solvency II as many of the requirements and procedures are similar
- Dealing with multiple correlation matrixes, including correlation between risks and between geographic regions
- Wrestling with future tax rates for the global entity
- Deciding whether to create a health module or leave the health risks within the life or non-life rubrics
- Performing stress tests addressing shocks to (for life companies):
 - Mortality
 - Morbidity
 - Longevity
 - Lapse
 - Expense

- Applying risk-factors to an exposure (for non-life companies) for:
 - Non-life premium
 - Non-life claim liability
 - Latent liability
- Considering these risks (for both life and non-life companies):
 - Operational
 - Market (interest rate, equity, real estate, currency)
 - Credit (default)
- Applying to become Head of Insurance Group
- Tearing up as you realize available capital will be tiered as the banks do
- Identifying scope such that significant non-insurance entities are within ICS perimeter
- Modeling the expected effects of natural and man-made catastrophes such as typhoons, earthquakes, pandemic, and terrorism
- Collecting and submitting data on a wide range of topics, such as exposure information by line of business by jurisdiction, in order to allow supervisors to ultimately develop factors for the ICS that are based on actual observed results
- Enhancing your segmenting skills, such as property-like or liability-like for non-life companies and six geographic regions (Europe, U.S./Canada, emerging markets) for diversification purposes
- Can internal models be used more?
- Discount rates. For the MAV, the ICS is not using the risk-free rate. Investigation during 2017 will look at a) a blend of prescribed rates/curves, b) a rate based on own assets with guard rails, and c) an AA curve minus a spread. It has been noted by FASB followers that the typical life company's portfolio is more reflective of a single rather than double A security.
- There should be linkage between assets and liabilities discount rates; the liability discount rate should reflect how the company invests.
- Many markets consider that surplus notes and senior debt are surplus that is available to fund policyholder claims in time of stress. Is this appropriately reflected in the tiering?
- Artificial volatility needs to be eliminated. Artificial volatility can be introduced by a reference portfolio. Volatility can be inflated by using a subjective, unsubstantiated spread haircut.
- The investment portfolio already reflects the nature of the liabilities. Assets are selected based on the maturity and liquidity of the products.

TIMETABLE AHEAD

The IAIS has scheduled the release ICS version 1.0 for 2017. Field testing will again occur in 2017. The IAIS has scheduled the release v2.0 in 2019. This will be part of ComFrame as the capital requirement component of this supervisory material (which is targeted to IAIGs). All three IAIS global capital standards are focused on being consolidated group wide assessments.

The IAIS cannot require or mandate that any of its standards be enacted in any jurisdiction. The IAIS expects its members (there are about 200 of them, including the 50 United States) to implement IAIS standards to the best of their abilities and as appropriate in their jurisdictions.

The U.S. has announced its own efforts to develop capital requirements for insurance groups. Both the Federal Reserve Board (who generally deliberates in private) and the National Association of Insurance Commissioners (who deliberates issues in public) are developing their own approaches for development of group capital. ■

The author thanks Ralph Blanchard and Josh Windsor for their insights.



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The ultimate goal of this calculation will be the development of a ratio. It is of the form actual to required, or more explicitly Qualifying Capital Resources in the numerator and the ICS capital requirement in the denominator.

Of course, these concepts are from where we stand at the end of 2016; the ICS will certainly evolve before its finalization.

KEY CONCEPTS STILL TO BE ADDRESSED

At a January ICS stakeholders meeting, participants identified many areas they felt needed significant attention. Some of these are:

- The interplay between the ICP's and ComFrame needs to be clarified. The IAIS will have several public consultations on this during 2017.
- The potential redundancy between the MOCE and available capital needs to be resolved.
- The benefits and use of ALM needs to be better reflected as well as other, if not all, aspects of the company's business model.

The Complications of Cyber Risk Quantification

By Juliette Fairley

Editor's Note: This article originally appeared on www.garp.com. It is reprinted here with permission.

There are measures of the economic toll of cybercrime. A recent report from insurer Allianz said the total annual cost is \$445 billion, the majority concentrated in the 10 biggest economies led by the U.S. (\$108 billion), China (\$60 billion) and Germany (\$59 billion). Allianz quoted the Ponemon Institute statistic that data breaches cost companies an average \$3.8 million in 2015, compared with \$3.5 million the year before.

However, for corporate managements and their boards, cyber threats and their costs are a continuously evolving, moving target and a source of uncertainty. While the need for robust security is self-evident and attracting significant investment dollars, demand is building for insurance products that can provide an important risk management backstop.

According to Allianz, the cyber insurance market is in its third major phase of development, representing an estimated \$2 billion in premiums that are growing at a double-digit annual rate, but it is very much a work in progress.

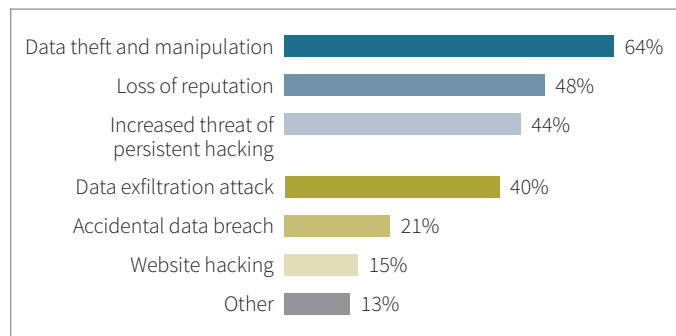
"The stand-alone cyber insurance market will continue to evolve, but development will bring challenges, with many concepts and wordings yet to be tested, potentially resulting in litigation," Allianz said in *A Guide to Cyber Risk: Managing the Impact of Increasing Connectivity*. "This is not unusual with new products and can improve risk knowledge."

COST ANALYSIS AND DATA SCIENCE

Enterprises are grappling with the difficulty of calculating their cyber risk exposure as a prerequisite for setting risk mitigation strategies and understanding how insurance fits in.

"The question is, is it really possible to put a dollar sign on fast-changing cyber risks with data that is difficult to find and often even harder to interpret?" Oliver Wyman consultants Leslie Chacko, Claus Herbolzheimer and Evan Sekeris wrote in the October 2016 *Harvard Business Review*.

Figure 1
Which Cyber Risks do Companies Fear the Most?



Source: Allianz Risk Barometer 2015. Figures represent a percentage of all eligible responses to the questions (127 in total). More than one risk selected.

Quantification is "challenging, but feasible," they said. It requires going beyond the conventional operational-risk approach that focuses narrowly on revenue losses, and evaluating instead "a broader set of losses associated with cyber attacks...The direct revenue losses for the companies involved in a cyber attack can be nearly negligible compared to the reputational damage incurred, which in turn can lead to future revenue losses. That is why it is essential for managers to quantify cyber risks more broadly."

The insurance industry is taking notice of Cyence, a San Mateo, California-based company that has developed, drawing on advances in data science, a platform for the economic modeling of cyber risk. Founder and CEO Arvind Parthasarathi has noted that a majority of cyber-loss incidents are the result of human actions, which, whether purposeful or accidental, are not per se technological.

Therefore, comprehensive cyber risk modeling must take technical, economic and behavioral factors into account.

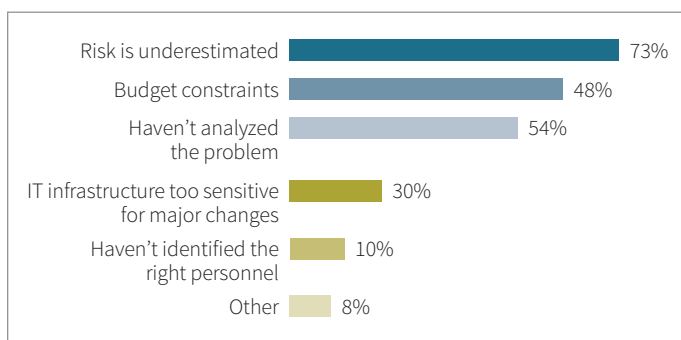
"To economically model cyber risk requires bridging the disjointed disciplines of cybersecurity and insurance/risk modeling," Parthasarathi said in October when announcing members of an advisory board of insurance and cybersecurity experts. "Barely a month out of stealth mode, our economic cyber risk modeling platform is leveraged by a who's who of the insurance industry as a competitive advantage. I look forward to working with our advisory board on continuing to be the economic risk model for cyber robust enough for insurers to deploy capital against."

Parthasarathi's who's who includes Richard Booth, former vice chairman of reinsurer Guy Carpenter; Tom Hutton, managing partner of XL Group's XL Innovate venture capital fund; and Sean Kanuck, who served as the first U.S. National Intelligence Officer for Cyber Issues, from 2011 to 2016.

INTERCONNECTIONS AND SUPPLY CHAINS

“Failure to keep pace with technological advancements will leave an organization at a terrible disadvantage,” said Julie Pemberton, president of RIMS, the Risk Management Society, which in October released results of its annual Cyber Survey. “Embracing technology has enabled organizations to strengthen their performance, but, at the same time, has created many new exposures that risk management must address.”

Figure 2
What is Preventing Companies Being Better Prepared Against Cyber Risks?



Source: Allianz Risk Barometer 2015. Figures represent a percentage of all eligible responses to the questions (127 in total). More than one risk selected.

Among those emerging exposures, highlighted in the Allianz report, are the Internet of Things—web-connected devices that heretofore have been largely insecure and could number more than a trillion by 2020—as well as heavier reliance on cloud computing and third-party risks stemming from vendors and supply-chain relationships. All have the element of interconnectivity that complicates risk assessment and management.

“Businesses are driven by real-time data,” Allianz said. “Any interruption of the process chain—even for a minute—could cause a severe business interruption, impacting the balance sheet.”

“With increasing interconnectivity, globalization, and the commercialization of cybercrime, there has been an explosion in both frequency and severity of cyber attacks,” said Chris Fischer Hirs, CEO of Allianz Global Corporate & Specialty (AGCS).

The RIMS 2016 survey, conducted in August and September with 272 respondents, found that 80% of organizations had stand-alone cyber insurance policies, up from 51% in 2015. One-fourth were spending more than \$500,000 on premiums. Those purchasing cyber insurance as a result of contractual obligations increased to 25% from 8%.

Each company that has a role in the supply chain is trying to protect its status in that supply chain, according to Emily Cummins, a RIMS board member and managing director of tax and risk management for the National Rifle Association. “It’s the likelihood of contractual requirements in the chain that is increasing, because no company is self-reliant,” she says.

E&O PROTECTION

Technology vendors would do well to carry errors and omissions (E&O) in addition to cyber risk coverage, says Emy Donovan, head of cyber business for AGCS in North America.

“When an organization relies on a vendor for their network, and that network goes down, the vendor is probably not covering their client’s consequential business-income loss under a cyber policy,” Donovan tells GARP Risk Intelligence. “With a tech E&O policy, there can be coverage for a vendor’s liability resulting from a client’s losses.”

With the increasing popularity of cloud services for data storage, 69% in the RIMS survey said they have obtained coverage for it.

“It’s one of the most sensitive areas in the insurance application process, because the fact that different insurance policyholder might be sharing some of the same cloud providers is an aggregation of risk for the insurance company,” Cummins points out.

INCREASING REGULATION

Companies also must cope with a “shifting regulatory landscape,” as Allianz put it, notably data protection and breach-disclosure requirements that can increase both compliance and remediation expenses.

“In Europe, we can expect tougher rules on a country-by-country basis,” Nigel Pearson, global head of fidelity, AGCS, said in the Allianz report. “Politically, it is difficult to be seen to be soft on data breaches. We will see more notifications and significant fines for data breaches in future.”

In the RIMS survey, 48% said cyber breach reporting should be mandated by government, and 27% disagreed.

In the U.S., where insurance is regulated on the state level and a number of states have enacted breach reporting requirements, a federal mandate is seen as unlikely. Allianz’s Donovan sees a “standard of care” evolving along the lines of the National Institute of Standards and Technology cybersecurity framework, to which directors and officers of companies can be held accountable.

DOCUMENTATION AND EDUCATION

“A risk manager or risk professional can help control the steady rise in insurance premiums by providing very good documentation during the insurance application process,” Cummins says.

“Detail about risk controls in an application’s cyber security risk assessment section can help lower the cost of premiums.”

Such details may include documentation of employee security training, encryption and authentication, intrusion prevention and detection, vendor risk assessment, security by design, and compliance with the PCI (Payment Card Industry) standard.

Because “most reportable data breaches are triggered by unintentional employee error,” Cummins says, “emphasizing year-round employee security training sends a strong message that an organization is a good insurance risk because they’re doing the best they can to prevent a reportable event.”

She underscores year-round employee education and training “because they need constant reinforcement of lessons” – phishing attacks being a continuing concern.

“In some of the companies with which I’ve been involved, one of the biggest problems is employees inadvertently opening an infected email or document because cyber hackers have gotten so good at disguising who and what they are,” says Christine Todd Whitman, the former New Jersey governor who is chairperson of the American Security Project, a nonpartisan educational organization focused on national security. “These

communications often look like they’re coming from the personnel or CEO’s office.”

“If the government were to introduce a cyber hygiene public awareness campaign, it would help consumers understand a server’s function, how a hacker gets in, and what a phishing attack looks like,” Donovan says.

As a response to policymakers’ viewing insurance as a component of national cyber resilience, Donovan is working with the U.S. Department of Homeland Security and the American Insurance Association on a glossary of insurance terms relating to cyber insurance coverage.

“In the U.S. and Europe, governments have been encouraging companies to build their resilience to a cyber attack, promoting cybersecurity standards and greater levels of cooperation, including sharing data,” the Allianz report noted.

Pearson added, “Interest in protecting critical infrastructure is likely to see governments becoming increasingly involved in cybersecurity, with much greater levels of scrutiny and liability.” ■

GARP editor-in-chief Jeffrey Kutler contributed to this article.



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International ORSA Regulatory Requirements Chart, September 2015

Last Updated [in part] in November 2016

International Actuarial Association

Note: This is an abbreviated version of a larger chart produced by the International Actuarial Association. For the full chart, more information, legal disclaimer and potential updates, please see http://www.actuaries.org/index.cfm?lang=EN&DSP=CTTEES_ORSA&ACT=DOCUMENTS or contact Amali Seneviratne, Director, Technical Activities at the International Actuarial Association.

ORSA means the Own Risk and Solvency Assessment insurers are required to perform in their respective jurisdictions. An

ORSA concept is described in Insurance Core Principle 16 of the International Association of Insurance Supervisors.

DISCLAIMER: The content of the International ORSA Regulatory Requirements Chart (the Chart) has been provided by individuals at the request of the Joint ORSA Subcommittee of the Insurance Regulation Committee and the Enterprise and Financial Risk Committee of the IAA. This information has been collated and presented for educational and informational purposes to the members of the IAA and interested parties.

ORSA Regulatory Requirements	Bermuda	Canada	EEA	United States
1 Reporting requirement	CISSA	ORSA	ORSA	ORSA
2 Effective date	1-Jan-11	1-Jan-14	1-Jan-16	1-Jan-15 (will vary by state)
3 Basis for requirement	CISSA 2011 Instructions Handbook	Guideline E-19 ORSA	Solvency II Directive (2009/138/EC), COMMISSION DELEGATED REGULATION (EU) 2015/35 EIPOA Guideline Small insurers not covering risky business are excluded from the scope of the Solvency II Directive and hence they are not required to do ORSA	Individual state laws (NAIC model law "Risk Management and Own Risk and Solvency Assessment Model Act")
4 Applicability threshold	Class E, 3A, Class 3B, and Class 4 insurers	All federally regulated insurers including Canadian operations of foreign life and property and casualty companies operating in Canada on a branch basis, as well as fraternal benefit societies operating in Canada, except for regulated insurance holding companies and non-operating insurance companies	All Insurers and Insurance Groups subject to the Solvency II directive (individual Member State implementations may vary in respect of entities not falling under the scope of the Solvency II directive still applying some or all of those rules)	Insurers with gross premium over US\$500 million (excluding affiliate reinsurance assumed) or Insurance Groups with gross premium over US\$1 billion
5 Sufficiency of filing another country's ORSA report	Yes	No	No, unless based on an established equivalence decision that applies to ORSA as well	Yes, if it covers requirements in US ORSA Guidance Manual

ORSA Regulatory Requirements	Bermuda	Canada	EEA	United States
6 Requirement for group reporting with type of group if required	Yes	ORSA can be prepared either on individual insurer basis or on group basis. Group ORSA should give adequate consideration to business and risk profile of individual insurers in group and the particular circumstances of the markets in which it operates. The components of the Group ORSA that are used to support an individual insurer's ORSA should be consistent with expectations of E-19.	ORSA can be prepared either on individual insurer basis or on group basis. If the individual ORSA is not carried out then Group ORSA should give adequate consideration to the reason for the choice of the Group; a description of how the governance requirements are met at the level of these undertakings and in particular how the administrative, management or supervisory bodies (AMSB: the body that, under SolvencyII, has ultimate responsibility for running the entity) of the subsidiaries are involved in the assessment process and approval of the outcome; and a description of how the single ORSA document is organised in order to allow the group supervisor to separate individual assessments for the other supervisors	Yes
7 Requirement applicability to branches	Yes, given that braches roll up into legal entity	Required for all insurers licenced in Canada (including branches)	Branches are not required to provide ORSA on their own Based on proportionality, branches may/should be covered in the solo/group ORSA	Depends on state law for the branch's state of "entry" into the U.S. Most states treat branches using their state as the state of entry as if the branch were a domestic insurer in their state.
8 Basis of regulatory guidance: ORSA process or regulatory reporting of ORSA	ORSA Summary Report needs to be filed (some specific (minimal) content is prescribed)	OSFI expects an insurer to have processes in place to conduct an ORSA	Primary focus: helping decision making by the AMSB The ORSA also should be reported to the supervisor	Report
9 Recipient of ORSA report as per regulatory guidance	ORSA must be presented to the board and a copy submitted to the Bermuda Monetary Authority	ORSA report to the Board, Key Metrics Report to OSFI	Report to AMSB Report to Local and Group Supervisor Summary information of certain aspects to the Public	Lead state regulator
10 Purpose of the ORSA report	The Commercial Insurer's Solvency Self-Assessment (CISSA) is a regime that requires insurers to perform an assessment of their own risk and solvency requirements. This provides the BMA with the insurer's perspective of the capital resources (referred to as CISSA capital) necessary to achieve its business strategies and remain solvent given its risk profile, as well as insight into the risk management and governance procedures surrounding this process. Risk profile considers all reasonably foreseeable material risks arising from its operations or operational environment.	In conducting its ORSA, an insurer should determine its own capital needs and establish its Internal Targets based on an internal assessment of all material risks, including the results of the enterprise risk management process	Document the ORSA process and help decision making by the Board Provide information to the Supervisor on the ORSA process and results The undertaking should take into account the results of the ORSA and the insights gained during the process of this assessment in at least: a) its capital management; b) its business planning; c) its product development and design	To inform the regulator about the insurer's risks and solvency position. "The Commissioner will utilize the ORSA Summary Report to gain a high-level understanding of the insurer's ORSA."

International ORSA Regulatory Requirements Chart

ORSA Regulatory Requirements	Bermuda	Canada	EEA	United States
11 Frequency of the ORSA report	Annual	Annual	Annual or upon significant change in risk profile	Annual report, although update of group capital assessment can be requested in the interim if material changes occur.
12 Role of the Board with respect to ORSA.	Review CISSA	Insurer's Board should review and discuss ORSA as well as any changes to ORSA. Board should understand decisions, plans and policies being undertaken by Senior Management with respect to ORSA and its potential impacts on the insurer. It should probe, question and seek assurances from Senior Management that these are consistent with Board's own decisions and Board-approved business and risk strategy of the insurer, and that corresponding internal controls are sound and being implemented in an effective manner.	The AMSB should take active part in the ORSA, use ORSA results in decision making and approve the ORSA	Receive a copy of the ORSA report
13 Required quantitative assessment of risk and solvency	Yes	Yes	Yes	Yes
14 Linkage to required regulatory capital	No (BSCR capital is the actual requirement)	Yes	Yes	No
15 Required stress/ scenario testing	Yes, for all material risks	Yes	EIOPA Guidelines (see Point 3) require stress/scenario testing where appropriate	Yes, for all material risks.
16 Horizon for forward looking assessment	Planning horizon	Planning horizon	The undertaking should ensure that its assessment of the overall solvency needs is forward-looking, including a medium term or long term perspective as appropriate (EIOPA 1.21). As the ORSA should pass the use test, i.e. it should also be used by the company in its planning, the horizon probably usually is consistent with the business planning period	Business planning horizon
17 Valuation basis	Economic Balance Sheet	IFRS (same basis of reporting for public and statutory purposes)	Solvency II basis can be used, or any basis that the AMSB considers more appropriate than the Solvency II basis	Insurer's choice, but must disclose
18 Capital assessment basis (time horizon, risk metric)	Regulatory (1 Year, 99 TVaR) and Own Risk Assessment	Insurers' capital assessments will reflect their own choice of data sets, distributions, measures, confidence levels, time horizons, valuation approaches, financial tools and methodologies, appropriate to their own unique profile	Solvency II basis can be used, or any basis that the AMSB considers more appropriate than the Solvency II basis	Insurer's choice, but must disclose

ORSA Regulatory Requirements	Bermuda	Canada	EEA	United States
19 Required documentation of ORSA process	Yes	Yes - ORSA processes and results	ORSA Policy; a proper record of each ORSA; and internal report and a possibly different report to the supervisor of each ORSA	Must document the ORSA process and results internally (for possible supervisory review)
20 Relevant guidance	CISSA 2011 Instructions Handbook	OSFI Guideline E-19	EIOPA_Guidelines_on_ORSA_EN.pdf	NAIC ORSA Guidance Manual - July, 2014. Also the applicable state law(s).
21 Regulatory website with guidance links	http://www.bma.bm/document-centre/reporting-forms-and-guidelines/Insurance/Forms/DispForm.aspx?ID=17	http://www.osfi-bsif.gc.ca/Eng/Docs/e19.pdf , http://www.osfi-bsif.gc.ca/Eng/Docs/13-1663_ORSA_ins.pdf	https://eiopa.europa.eu/GuidelinesSII/EIOPA_Guidelines_on_ORSA_EN.pdf	http://www.naic.org/documents/committees_e_isftf_group_solvency_related_orsa_feedback_pilot_project.pdf
22 Other relevant information.			The Solvency II directive is transposed into the legislation of each Member State, thus local implementations may vary	All groups must also submit a Form F - Enterprise Risk Report, which may be partially satisfied by referencing Form F material already supplied via an ORSA report (for those subject to an ORSA requirement). http://www.naic.org/documents/committees_e_isftf_group_solvency_related_form_f_orsa_comp.pdf (Latest status of ORSA adoption and Form F are found on pages 7 and 4 respectively of the following link http://www.naic.org/documents/committees_e_related_smi_dashboard.pdf)
23 Last updated by respondent/reviewer	8th of November, 2016	8th of November, 2016	10th of November, 2016	10th of November, 2016

JRMS e-Library

By Frank Reynolds

Based on a recent survey of our section's membership, our members indicated that they want to know more about the section's e-Library and its contents. Here is some useful information about the JRMS e-Library.

- The library currently contains some 96 books and several more will be added this year.
- Risks covered include credit risk, operational risk, strategic risk, sovereign risk, liquidity risk, and natural disasters.

- There are also management books on capital management, risk culture, best practices, and emerging risks.
- For the more technical, there are books on risk modelling, tail risks, VaR methods, and derivatives.
- For the Canadian members, only one book listed in the Skills and Knowledge Index (what you should know to practice in the field) is present but some of this deficiency will be addressed this year.

To see the library's contents go to the Joint Risk Management Section's page on the SOA website and click on the "resources" tab at the top, then click the link for "EBSCO e-books." You will need to login using your SOA user information.

The books can be downloaded and used for a period of two weeks.

Good reading! ■

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World Economic Forum

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2017 AFP RISK SURVEY

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<http://www.oliverwyman.com/content/dam/oliver-wyman/v2/campaign-assets/jan/2017RiskSurvey-FINAL-2.pdf>

ECONOMIC CAPITAL FOR LIFE INSURANCE COMPANIES SOA

<https://www.soa.org/Files/Research/Projects/research-2016-economic-capital-life-insurance-report.pdf>

MODELING THE UNEMPLOYMENT RISK IN INSURANCE PRODUCTS

CIA, CAS, and SOA

<https://www.soa.org/Files/Research/Projects/research-2016-unemployment-insurance-report.pdf>



2016 VARIABLE ANNUITY GUARANTEED BENEFITS SURVEY SURVEY OF ASSUMPTIONS FOR POLICYHOLDER BEHAVIOR IN THE TAIL CIA, CAS, and SOA

<https://www.soa.org/Files/Research/research-2016-variable-annuity-survey.pdf>

LOW INTEREST RATE ENVIRONMENT CRO Forum

<http://www.thecroforum.org/wp-content/uploads/2016/12/LIRE-CRO-Forum-Working-Group-December-2016-FINAL.pdf>

ERI RISK INITIATIVE RISK RADAR UPDATE 2016

CRO Forum

<http://www.thecroforum.org/wp-content/uploads/2016/12/ERI-Radar-October-2016.pdf> ■

Charting the Evolving Role and Authority of the CRO

2016 Ernst & Young Insurance CRO survey

By Chad Runchey and David Paul

INTRODUCTION

EY's Insurance Risk Management Team has run an annual survey of Chief Risk Officers (CROs) since 2010. Over the period, the survey has charted the evolving role and authority of insurance CROs, as well as the development of Enterprise Risk Management (ERM) capabilities generally.

The 2016 survey was larger than in previous years, with more participating organizations and greater diversity among them.

Sector:

P&C: 55%

Life: 35%

Composite: 10%

Survey participants ranged from large global organizations with multiple regulatory regimes (including US Federal Reserve Board oversight) to midsized national carriers with only state Department of Insurance (DOI) regulators.

The interviews for the 2016 survey were held between December 2015 and April 2016. This article highlights some key outputs and summarizes four of the key themes of the survey: maturation of risk management; CRO roles, responsibilities and reporting lines; ORSA—one year in; and risk appetite. The complete survey and its full findings can be found at <http://www.ey.com/us/en/industries/financial-services/insurance/ey-2016-north-american-insurance-cro-survey>.

The increasing influence of ERM is being earned on its own merits.



MATURATION OF RISK MANAGEMENT

This year's survey revealed a spectrum of maturity levels of ERM programs—from very impressive frameworks that are integral to and influential in how the business is run, to others that are limited in scope and formality. To a degree, this variety reflects the inclusion of a broader and more diverse group of participants in the 2016 survey, compared with past years.

The survey also clarified the role that companies expect CROs to perform. Where ERM structures are advanced, CROs are very senior officers and participate in decision-making at the highest levels of the organization. At the other end of the continuum, the survey included several insurers that do not have a single, titled CRO role, though there may be an officer leading ERM efforts. More robust ERM programs have typically been in place for a few years and are now fully embedded as part of routine business operations, while late adopters struggle to define the ideal role, structure and prominence of their risk teams.

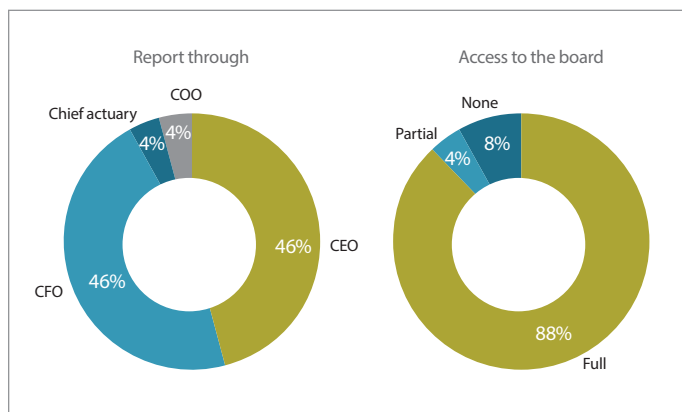
Interestingly, despite the varying levels of sophistication and formality, all survey respondents felt their organizations have adequate processes to manage the risks to their business. In some cases, there was a degree of complacency where risk management capabilities did not seem sufficiently developed. There were just as many examples, however, where risks are very effectively monitored, controlled and mitigated without the recognizable or formalized superstructure that is often associated with “modern” ERM.

CRO ROLES, RESPONSIBILITIES AND REPORTING LINES

One of the objectives of the 2016 survey was to assess the current roles and responsibilities of CROs. The general trend seen was toward larger roles and increasing responsibility, much of it occurring at the senior management level and with a broader range of stakeholders across the business. The results also revealed the most prevalent organizational structures, along with interesting variety in the shapes and sizes of risk teams.

Governance structure: Most CROs report directly to either the CFO or the CEO. *See Figure 1* In a few cases, the CRO reports through another position, such as the chief actuary or COO. The independence of CROs has been a frequent topic of discussion in recent years. Most CROs have full access to the board and attend quarterly risk committee meetings. Many also attend board subcommittee meetings, such as the audit committee. In organizations where the CRO reports to the CFO, the independence of the risk management function is less clear.

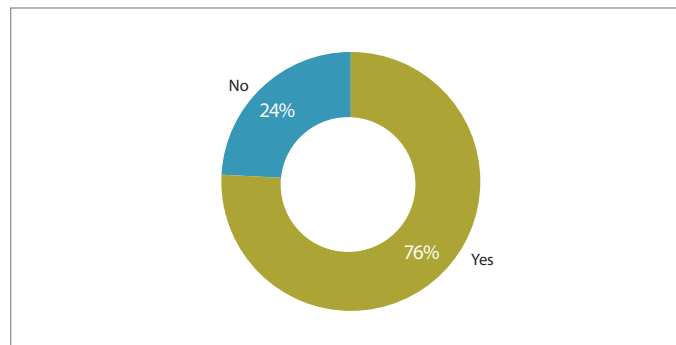
Figure 1
Reporting Lines and Board Access



Three lines of defense: The “three lines of defense” model has become the norm for most of the financial services industry, and more than three-quarters of survey respondents reported its formal adoption at their organizations. *See Figure 2* Many of the organizations that have not implemented the model indicated it is unnecessary, too bureaucratic or costly. These organizations were also unlikely to adopt “three lines of defense” in the near future and were not subject to regulatory requirements to adopt it.

Organizations that aspire to adopt the model reported challenges in demarcating the three lines, particularly where first- and second-line responsibilities reside with the same officer. Some survey participants seemed slightly complacent when compared with peers who have made strides in governance to ensure proper independence for the risk management function.

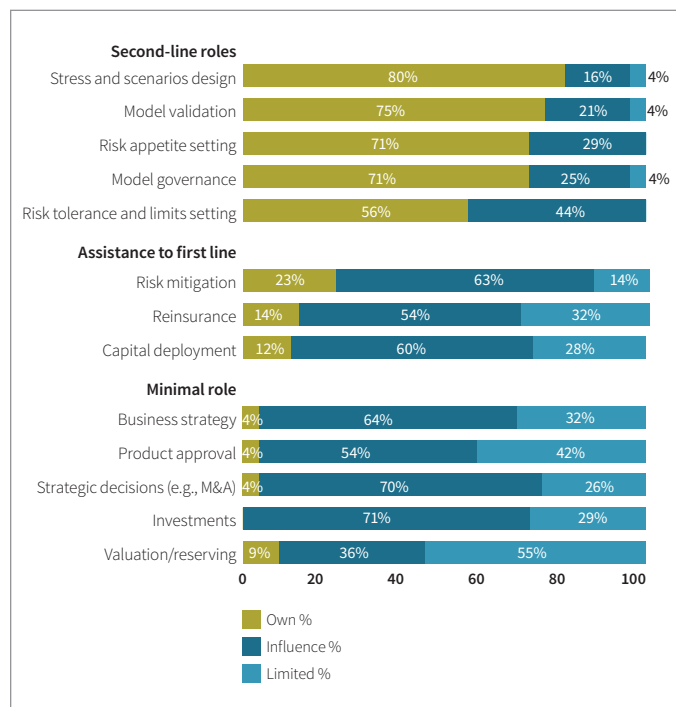
Figure 2
Formal Adoption of a Three Lines of Defense Model



CRO roles and responsibilities: In terms of CRO responsibilities, there are varying degrees of influence across a range of activities. It was somewhat surprising that not all second-line roles (such as model validation and risk appetite setting) were fully owned by CROs. *See Figure 3*

For capital deployment, strategy, product approval, reinsurance, risk mitigation and reserving, most CROs have influence but not ownership. This finding aligns with the second line of defense’s increasing role as an “effective challenge” to decisions made by the first line.

Figure 3
Role of the Risk Function



ORSA—ONE YEAR IN

In late 2015 and early 2016, many insurers submitted their Own Risk Solvency Assessments (ORSA) filings to their state regulators for the first time. As such, the survey results indicate how state regulators are working with insurers with their ORSA submissions.

ORSA’s value: Comments from survey participants suggested the range of ways ORSA can produce current or future value. For instance, one CRO commented that having the ORSA report as a reference significantly shortened state-level audit procedures this year. For some insurers, ORSA highlighted gaps in risk management processes and capabilities and clarified opportunities to refine governance and committee structures. One respondent commented that the “internalization” of stress and scenario impacts allowed them to think about management responses more proactively.

All companies involved their board in the ORSA process, in alignment with guidelines from the National Association of Insurance Commissioners, and some CROs reported their board’s satisfaction with the report. Other firms used the ORSA as a source for employee education or as a single, centralized source for risk information.

Some survey participants did not regard the arrival of the ORSA requirement as significant, in that it gives rise to a report on general ERM activities that companies were taking anyway. Other respondents described plans for streamlining the ORSA process in the future, implying that less laborious efforts could yield more value. This was particularly the case among those firms that were submitting multiple ORSAs (e.g., for different entities, for different states or for international operations).

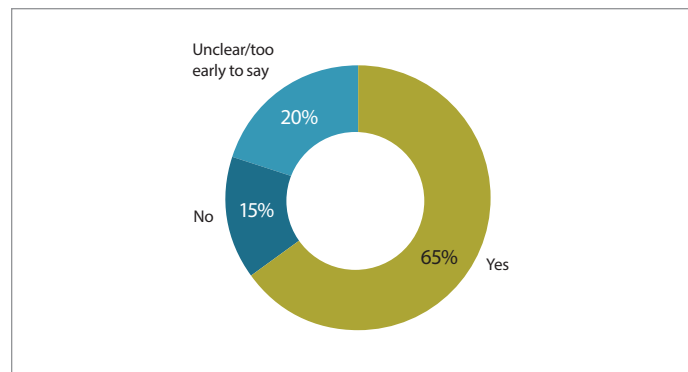
ORSA and the regulators: At the time of the survey, not all participants had received feedback from regulators on their ORSA submission. Those that had feedback indicated the following areas as needing enhancement:

- Clearer linkages between risk appetite and stress testing
- Increased focus on risk identification
- More detail on stress and scenario testing
- Reverse stress testing to determine what would it take for company to default
- Validation of results
- Inclusion in ORSA of M&A activity
- Clarity over unique ORSA features at mutual insurers

The survey results and comments from participants indicate that regulators are also coming to terms with ORSA—no surprise given that this was the first official year for submissions.

One respondent described a “learning curve” for regulators in determining the best way to use the content of the reports and determining an effective review process. But it was a majority view that ORSA improved overall regulator understanding of current risk management practices. *See Figure 4*

Figure 4
Better Regulator Understanding of Your Risk Management Practices as a Result of ORSA Report



RISK APPETITE

Virtually all respondents commented that their company’s risk appetite references both “economic” internal views of capital and regulatory requirements. *See Figure 5.* There was considerable variation in the internal view being used, with “economic capital” being defined in various ways by different companies.

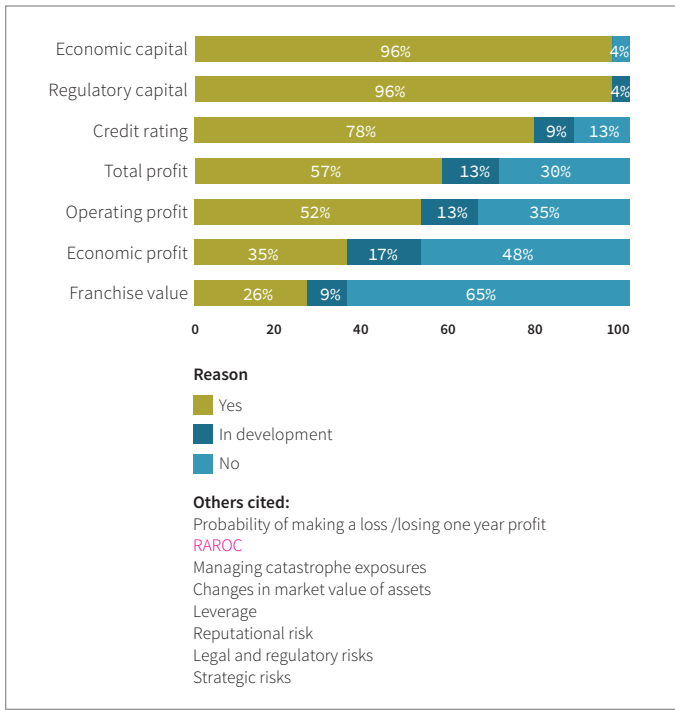
External credit ratings are the third most common metric referenced by risk appetites. This is particularly important in situations where insurers’ potential customers place their business largely based on the rating of the carrier.

Profitability measures are becoming more common within risk appetites. These can be as simple as stating some fixed probability (or zero probability) of the business incurring a loss. Various companies use operating, total or “economic” profit. A number of respondents described active projects to develop greater use of profitability measures within risk appetites.

CONCLUSION: CROs LEAD INSURERS FORWARD ON THE ERM JOURNEY

The 2016 survey results show that the influence of ERM programs, CROs and the risk teams they lead continued to grow in the 12 months since the 2015 survey. Participants reported incremental gains across a variety of areas: size of risk teams, access to senior management and boards, risk appetite setting, impact of the ORSA, quantification via stress testing, and capital modeling and risk reporting.

Figure 5
Metrics Used in Setting the Corporate Risk Appetite



While 2015 brought required ORSA submissions for most survey participants, the process proved to be less of a hurdle than might have been expected. Many companies had already “upped their games” through the ORSA pilots of preceding years. Furthermore, survey participants saw little evidence of strong challenges from state regulators receiving the first round of ORSA submissions.

The cumulative results of the survey showed that, in the absence of regulatory drivers, the increasing influence of ERM is being earned on its own merits — a very good place for industry CROs to find themselves. ■



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