



SOCIETY OF ACTUARIES

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# Risk Management and Actuaries—

## SOA Risk Management Task Force Update

by David Ingram and Valentina Isakina

### Why risk management and why now?

If you have not yet heard about the SOA's risk management initiative, you have probably been deleting the SOA emails from your inbox without reading them! The SOA Risk Management Task Force (RMTF), chaired by Dave Ingram, is actually almost two years old. It was created under the Finance Practice Area of the SOA as an effort to improve the educational and professional opportunities as well as the availability of tools for actuaries in the area of risk management.

At the beginning, the RMTF consisted of only about a dozen dedicated actuaries interested in a number of risk management issues. By the spring of 2002, it was clear that additional resources were needed to address the growing concerns of the profession regarding risk management. The RMTF received a major boost of "new blood" in March of 2002, when a blast email was sent out to the SOA membership with a call for additional volunteers. The resulting interest was overwhelming, and today, the 10 different subgroups and over 200 members of the RMTF are working to address various issues via new research proposals, surveys, seminars, and a task force Web site hosted out of the SOA Web site.

### The RMTF—The "Grass Roots" Efforts

Although the initiative to form the RMTF originated from the Finance Practice Area of the Society, the subgroups of the RMTF have been emerging as a purely "grass roots" effort of its members. The RMTF leaders give a green light to a new subgroup whenever at least a couple of RMTF participants develop an interest to pursue a particular topic or issue. As a result, the various initiatives being addressed by the subgroups are of critical interest to the actuaries practicing in today's unsettling economic and regulatory environment. Moreover, some of these subjects are typically quite new for actuaries with the current industry knowledge in those disciplines either still emerging or even lacking.



The subgroups of the RMTF can be broadly classified as those pursuing various technical topics and those addressing more strategic issues relevant to the advancement of the actuarial profession in the risk management arena. The subgroups are currently as follows:

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|--|-------------------------|
| 1. RBC Covariance                              | Leader: Jim ReiskytI    |
| 2. Policyholder Behavior in the Tail           | Leader: Jim ReiskytI    |
| 3. Extreme Value Modeling                      | Leader: Tom Edwalds     |
| 4. Economic Capital Calculation and Allocation | Leader: Hubert Mueller  |
| 5. Risk Management Metrics                     | Leader: Dave Ingram     |
| 6. Pricing for Risk                            | Leader: Todd Henderson  |
| 7. Equity Risk Modeling                        | Leader: Josephine Marks |
| 8. Health Risk Management                      | Leader: John Stark      |
| 9. Risk Management Position and Strategy       | Leader: Dave Ingram     |

10. Enterprise Risk Management (incorporates the Chief Risk Officer subgroup)	Leader: Mark Shaw  Leader: Juan Kelly
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At this point, each subgroup has established a devoted nucleus of about a dozen particularly active members who are the main driving force behind the progress. Other RMTF members participate by following the subgroups' progress via listserves (e-mail distribution lists established for the ease of communication) and stepping in when a particular issue strikes their interest.

Anyone with enough enthusiasm is welcome to join in. The extent of participants' experiences ranges from expert-level to none. While this may seem as possible drawback, the mix is actually proving to be one of the key ingredients for the resulting success of the RMTF. The immense enthusiasm for learning and readiness to dive into projects serves as an excellent complement to expertise.

## Projects Update

While the subgroups are in various stages of progress in their work, overall, a tremendous accomplishment has been made since this spring, when the majority of the current volunteers came on board. The following paragraphs will briefly describe the subgroups and their key undertakings.

## RBC Covariance

As you have probably experienced in your actuarial practice, the subject of risk identification, natural risk hedges and how various risks may interplay with each other arises in actuarial work quite frequently. However, from a practical perspective, there has not been much developed in this area to be of any use to an actuary. The RBC Covariance subgroup, therefore, undertook the initiative to consider what can be done at the SOA level on this subject. The broad goal of the subgroup is to determine the covariance and correlation among the various insurance and, possibly, non-insurance risks to guide the actuary in establishing surplus targets that meet pre-determined goals—such as at a 99 percent confidence level. As a result, the subgroup is developing various research ideas on the topic and shepherding them through the necessary process to obtain the recognition as SOA research initiatives and become funded for research.

One such idea on the subject of dynamic covariance and correlations (covariance and correlations as a

function of time and degree of uncertainty) has been recently accepted by the SOA and exposed to industry researchers. The subgroup is currently in the process of evaluating the proposals that came in from the industry in response to the research request and then forming a project oversight group (POG) to begin the research process. For more information on this topic, go to [http://www.soa.org/research/rbc\\_covariance\\_rfp.html](http://www.soa.org/research/rbc_covariance_rfp.html).

Another research initiative that is currently in the works will address the issue of a risk aggregation and disaggregation at a company or industry level. The goal of this potential project is to provide actuaries with both a theoretical background and practical approach in addressing:

1. the basis for aggregating individual risk factors into broader risk categories, or disaggregating a company or the industry into broad risk categories
2. the covariance among these broad-risk categories as a measure of the overall risk reduction through the benefits of diversification of risk.

## Policyholder Behavior In the Tail

The subject of evaluating potential policyholder behavior and identifying possible drivers of such behavior is of an utmost interest to the insurers. This is even more relevant now, considering the recently experienced extreme fluctuations in the economy and the resulting hike in utilization of various options by policyholders against the insurance carriers.

The subgroup dealing with this topic aims to address the development of such assumptions and identify possible ways to model policyholder behavior for various insurance and annuity risks under different economic conditions. Where such practical models do not exist, the subgroup's goal is to establish research initiatives for their development and, where some theoretical models exist but are not directly applicable to actuarial practice, to solicit adaptation of such theory to practical actuarial use.

Currently, the subgroup is in the process of developing several research proposals addressing modeling of surrenders, lapses and withdrawal behavior of policyholders in extreme scenarios for several products, including variable annuities, universal life insurance and long term care. Given the extent of research work needed on such topics and the fact that many behavioral models are data-driven, collecting the necessary

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policy-level information for such research is a project of its own. Therefore, the subgroup is starting this undertaking by surveying the industry carriers for their potential interest in contributing to an anonymous data bank to be used for the purposes of modeling policyholder behavior under extreme conditions.

## Extreme Value Modeling

When setting distribution assumptions in their day-to-day actuarial work, defining a distribution of a random variable to be normal is a common method used by practicing actuaries to simplify modeling techniques and various calculations. However, very few insurance

**At the enterprise level, Economic Capital is typically defined as "sufficient surplus capital to meet negative cash flows at a given risk tolerance level."**

risks are truly normally distributed. To raise the awareness of actuaries on this topic, the Extreme Value Modeling subgroup decided to address the "fat tail" phenomenon of the insurance business.

In particular, the subgroup is striving to ascertain what potential impact on solvency such an assumption of normality might have in regard to various insurance risks. To address this rather complex issue, the subgroup is currently surveying the existing theoretical literature on the subject of extreme values with the hope to find practical answers to this problem and, where none exist, develop research proposals to address the gaps.

## Economic Capital Calculation and Allocation (ECCA)

Recently, the concept of economic approach to accounting for insurance cash flows has been receiving increasingly greater attention within the insurance. In November 2002, the ECCA subgroup conducted an extensive survey on the subject of economic capital. The survey was distributed to the members of the RMTF, as well as the Investment Section, International Section and Financial Reporting Section membership. In response to the survey, about 500 responses were collected, compiled and carefully analyzed.

While the exact definition of economic capital is still up for debate, 81 percent of the survey respondents agreed ("strongly agreed" or "somewhat agreed") on a strawman definition of the economic capital.

To further address this issue, the ECCA subgroup is incorporating the survey results into a comprehensive specialty guide to introduce the concept of economic capital to practicing actuaries. The specialty guide will provide information on the current industry approaches to calculating economic capital, what risks it is typically designed to cover and possible case studies illustrating uses of economic capital in the industry. In addition, the subgroup is conducting a review of the existing literature on the subject, and the EC specialty guide will include a bibliography of the applicable literature on this topic.

## Risk Management Metrics

Identification of various risks is not a complicated concept for an actuary. Measuring the risks that have been identified is a completely different matter. Some of the risks can be extremely difficult, if not impossible to ascertain accurately, and the question of what risk measures to use under what circumstances is also a challenging one.

To address some of these issues, the Risk Management Metrics subgroup is working on the development of a risk metrics guide for actuaries. This comprehensive guide is intended to provide the actuaries with a practical tool that describes and evaluates various risk management metrics applicable to the insurance business. The risk metrics currently under the subgroup's considerations range from traditional measures, such as duration and convexity to conceptually newer measures, such as Value at Risk (VAR) and Conditional Tail Expectations (CTE). The guide will define a range of risk-management metrics commonly used today and address their actionability through illustrations of how to utilize the metrics in a company decision-making process.

## Pricing for Risk

At the heart of the Pricing for Risk subgroup's interest lies the question about the effectiveness of various pricing techniques used by insurers in capturing product risks. In particular, the subgroup is trying to establish a range of methods used by the industry to quantify risks

associated with the sale and administration of insurance products.

The subgroup's work is directed toward developing a comprehensive guide on pricing for risk that would analyze the existing practices and provide discussion of methods used. A survey of such practices and methods was completed and the subgroup is in the process of analyzing the results.

## Equity Modeling

During the period of booming equity markets, the industry introduced a variety of new insurance product designs directed to accommodate customers' desires for equity-market participation. This created enormous capital markets exposure for the industry, resulting in equity risk becoming the dominant market risk for the insurance companies' portfolios.

To address the challenges an actuary faces in trying to establish ways to cope with this recent phenomenon, the aim of the Equity Modeling subgroup is to assess the availability of modeling tools and techniques to measure and manage equity risk for actuarial purposes. The subgroup began working toward its goal by looking into available resources on various modeling techniques. One particular challenge identified immediately was the extremely theoretical nature of the existing literature on the subject of equity modeling, which is of little practical use to actuaries. Once the analysis of the available literature is completed and gaps in knowledge are identified the subgroup may

start working on formulating potential research initiatives to advance the practical applicability of existing theory on the topic.

The ultimate objective of the subgroup is to develop a specialty guide on equity modeling that would equip an actuary with practical tools on the subject. The guide may provide analyses of various modeling options available to deal with equity risk, including description of these models' assumptions and parameters. In addition, the subgroup is hoping to address advantages and limitations of various equity-risk models and provide commentary on possible ways to approach management of equity risks in an insurance company setting.

## Health Risk Management

Actuaries practicing in health-related disciplines seem to be facing a number of unique challenges, such as dealing with a hybrid of risks similar in characteristics to both the property/casualty industry and life insurance industry. The "grass roots" nature of the RMTF provided an opportunity for health actuaries interested in risk management to form a separate subgroup to address those challenges.

The Health Risk Management subgroup decided to split into smaller segments to address such topics as:

- Solvency issues in health insurance
- Availability of tools and modeling techniques for health risks
- Development of a specialty guide for actuaries on health risk management.

Ultimately, the subgroup is seeking to expand the current knowledge of health actuaries in the arena of risk management by initiating various research initiatives geared to advance the availability of tools and techniques of health actuaries in the arena of risk management.

## Enterprise Risk Management

The concept of an integrated or enterprise-level approach to risk management is currently one of the hottest topics for the insurance industry. The consequences of the Enron-related scandals to the broader financial services sector and the resulting actions by Congress propelled this already emerging trend to the

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new heights. Seemingly, no other topic is generating greater interest of the industry leaders than the concept of the enterprise risk management (ERM).

The ERM subgroup is aiming to address this growing interest by working towards the development of a comprehensive framework on identifying, measuring, monitoring and managing uncertainty within the ERM framework. The task is certainly not trivial, and the subgroup began its efforts by establishing broad industry contacts—both in the United States and abroad—aimed at consolidation of already existing work on the ERM subject that was accomplished outside the SOA realm.

The CRO job function is also a relatively new concept and appears to go hand-in-hand with the concept of ERM. A separate group of RMTF members is taking a closer look at the developing trends on this front and is trying to define a range of functions a CRO serves as well as the role of a CRO within the ERM framework.

As the subgroup is zeroing in on the available ERM resources and beginning to evaluate them. It has identified two valuable documents that may become the essential ingredients of the direction the subgroup takes on the ERM framework. These key sources are:

1. Implementing Turnbull from the Institute of Chartered Accountants of England and Wales
2. Casualty Actuarial Society Advisory Committee on Enterprise Risk Management Final Report

While the work of the subgroup on the ERM framework is only at its beginning stages, the above two documents can serve as a valuable initial resource for actuaries interested in gaining some background on the enterprise-level approach to risk management.

## Risk Management Strategy Group


Risk management has clearly emerged as a subject that evokes a strong response from many SOA members. Task force members have said that they are giving their time to this effort because they see risk management as the future of the profession. The Risk Management Strategy Group was formed for the dual purpose of supporting the efforts of the SOA Strategic Planning Committee regarding positioning the profession to our best advantage in the area of risk management and for planning future activities of the RMTF. This group was

started in October 2002 and has begun by committing to develop materials that support the proposal that actuaries are well-positioned to be a primary group involved in risk management in the insurance industry.

## The Future

The RMTF has no future without continuing support and interest from its members. Keeping the subject matter relevant and important to practicing actuaries is the key to achieving such interest and support. The “grass roots” structure of the RMTF serves this objective well, and, as the RMTF members develop additional areas of interest they would like to pursue, more subgroups may be created to accommodate the emerging interest.

The RMTF is attempting to make the SOA membership aware of its activities and findings. As a part of the effort, the organization of separate seminars focusing on risk management, as well as participation in regular SOA meetings are some of the goals the RMTF has been very successful in achieving thus far. In addition, the RMTF has enjoyed the continued support from the sections—in particular, the Investment Section—whose many members are active participants on the RMTF.

Clearly, the subgroups of the RMTF are working on projects of varying importance and critical need for the profession. The only way to make sure the RMTF is addressing the right questions is to get involved and become an active participant in its efforts. If you would like to learn more about the Risk Management Task Force in general or any of its subgroups in particular, contact Dave Ingram at [david.ingram@milliman.com](mailto:david.ingram@milliman.com) or Valentina Isakina at [visakina@soa.org](mailto:visakina@soa.org). 

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