

# Risk management



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# Risk management

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This newsletter is free to section members.  
Current issues are available on the SOA website  
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## JOINT RISK MANAGEMENT SECTION

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## ARTICLES NEEDED FOR RISK MANAGEMENT

Your help and participation is needed and  
welcomed. All articles will include a byline to  
give you full credit for your effort. If you would  
like to submit an article, please contact David  
Schraub, JRMS Staff Partner, at [dschraub@soa.org](mailto:dschraub@soa.org). The next issues of *Risk Management*  
will be published:

### PUBLICATION DATES

December 2013  
March 2014  
August 2014

### SUBMISSION DEADLINES

September 2, 2013  
December 3, 2014  
May 1, 2014

### PREFERRED FORMAT

In order to efficiently handle articles, please use the following format when submitting  
articles:

- Word document
- Article length 500-2,000 words
- Author photo (quality must be 300 DPI)
- Name, title, company, city, state and email
- One pull quote (sentence/fragment)  
for every 500 words
- Times New Roman, 10-point
- Original PowerPoint or Excel files  
for complex exhibits

If you must submit articles in another manner, please call Kathryn Baker, 847.706.3501, at the Society of  
Actuaries for help.

## Members Speak!

Love an article or strongly disagree with  
the opinion developed in another paper?  
Please share any comments or feed-  
back on the JRMS newsletter with David  
Schraub at [dschraub@soa.org](mailto:dschraub@soa.org).

## REQUEST FOR RESEARCH PROJECT INPUT

We need your examples of your experiences with regulatory risk, from the eyes of both  
those practicing and supervising.

The North American Actuarial Council (NAAC) Collaborative Research Group has recently  
initiated a study of regulatory risk conducted by Tom Herget and Dave Sandberg. The risk  
is the unintended results of regulations enacted to achieve supervisory objectives (or the  
lack thereof) on the market participants (whether policyholders, shareholders or regulators  
acting on behalf of taxpayers). This study will include examples of regulatory risk.

While the researchers will be contacting individuals in the US, Mexico and Canada, they  
would also welcome contributions from a wider pool of contributors who can provide their  
personal examples of regulatory risk both within and outside of North America.

The researchers would appreciate any contributions section members could make. Please  
email descriptions of regulatory risk to Barb Scott ([BScott@soa.org](mailto:BScott@soa.org)) for consideration by the  
researchers. Detailed descriptions are encouraged.

# Chairperson's Corner

By Barry Franklin

**AS RISK MANAGEMENT PRACTITIONERS** we live in interesting times, and as I survey the horizon it seems they are bound to become even more interesting in the future. Between evolving regulatory requirements, continual improvements in (and increasing expectations of) risk modeling, unrelenting global financial headwinds and the incredible pace of technological advances, it is sometimes difficult for today's risk manager to know where to focus attention. The Joint Risk Management Section (JRMS) seeks to further the science of risk management by promoting practical and technically sound research to help risk management professionals meet emerging challenges, through which efforts the profile of the actuarial profession is enhanced. Let's take a brief look at three current and proposed areas of research.

## HOW TO READ AN ORSA

*"Perhaps when a man has special knowledge and special powers like my own, it rather encourages him to seek a complex explanation when a simpler one is at hand."*  
Sherlock Holmes

ORSA reporting requirements in Europe, the United States and Canada present actuaries with an opportunity to communicate risk concepts to a broader audience—for better or worse. While some would argue the opportunity lies in providing actuaries with a vehicle for demonstrating our quantitative prowess through economic capital modeling and prospective solvency assessment, I would suggest the more significant opportunity relates to our ability to clearly communicate risk information to key stakeholders. Rightly or wrongly, actuaries are more often chided for our communication skills than our calculation skills. While we absolutely need to ensure the quality of the technical work underlying various ORSA reports, we cannot stop there.

The JRMS plans to launch a call for essays on how to read an ORSA; it is hoped that publishing a collection of such essays will provide a useful road map for insurance executives to effectively navigate an ORSA report and find the information they require. Along the way, such a resource might also help practicing actuaries produce more user-friendly reports for their audiences.

## MODEL VALIDATION

*"Mathematicians finally developed a financial model to accurately compare apples and oranges. Any two kinds of fruit can be compared, although guavas still cause minor rounding errors."*  
Graham Parke

A model can be a powerful tool, an interesting distraction, or potentially a weapon of mass destruction. One of the lessons learned from the global financial crisis was the need for financial models, including critical assumptions and key parameters, to be challenged and validated. The JRMS is encouraging research to provide practical guidance to actuaries in the validation of economic capital and similar models. As with the Hippocratic Oath in medicine, the first objective of actuaries using sophisticated models should be to "do no harm."

This effort dovetails quite nicely with the ORSA topic as well. A critical aspect of ORSA addresses prospective solvency assessment which by its very nature relies on models—stochastic or otherwise. Even the most effective communication cannot overcome the reputational damage associated with actuaries relying on results derived from inappropriate models and assumptions. Thus, while we need to communicate effectively, we first need to calculate correctly. Model validation is a must.

## INCENTIVE COMPENSATION

*"The fact that people are full of greed, fear, or folly is predictable. The sequence is not predictable."*  
Warren Buffett

Stock-based incentive compensation programs were initially introduced to remove the incentive to mask current financial problems in order to maximize reported revenue and earnings and boost annual cash bonus payments. Now there is concern that such programs may increase risk even further by incentivizing executives



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CONTINUED ON **PAGE 4**

to mask long-term growth and profitability problems. The issue extends well beyond stock options and the executive suite, however. While actions of executives garner more headlines and arguably have the potential to do the most visible damage, misaligned incentives at any level of the organization can have a profound effect on risk culture.

Analyzing the interaction of incentive compensation with risk behaviors can benefit companies of all types and sizes. Research of this nature opens the door for

actuaries to provide relevant risk management advice outside of our traditional areas of influence.

I hope you enjoy this edition of *Risk Management* and encourage you to look for developments with respect to these and other research efforts in the coming months. If you have ideas for practical research or other suggestions for the JRMS to provide support to risk management practitioners, please send your comments to: [dschraub@soa.org](mailto:dschraub@soa.org). ■

SOCIETY OF ACTUARIES

# YOUR VOTE COUNTS



## CALLING ALL ELIGIBLE VOTERS

Elections open **August 19** and will close **September 6 at 5 p.m. CDT**. Complete election information can be found at [www.soa.org/elections](http://www.soa.org/elections). Any questions can be sent to [elections@soa.org](mailto:elections@soa.org).

# SOA '13 ELECTIONS

[www.soa.org/elections](http://www.soa.org/elections)





# Letter from the Editors

By Jared Forman and Heather Adams

**INSURANCE RISK MANAGEMENT IS** undergoing a rapid and exciting evolution which makes practicing insurance risk management both challenging and fulfilling. Sources of this dynamic risk atmosphere include regulatory requirements, advances in risk modeling and the state of economies across the globe.

As new co-editors of the JRMS Newsletter, we would like to express our gratitude to the JRMS council and our readers for the opportunity to present a provocative publication which is intended to provide powerful insights, practical solutions and timely information related to risk management subject matter. We believe that combining perspectives from diverse backgrounds and experiences most often leads to the best view of a topic and our goal is to present articles across different geographies, experience levels, and industries. As this is our first newsletter, we feel it is important to introduce ourselves to you, our readers.

Jared Forman is an Associate of the Society of Actuaries and a Chartered Enterprise Risk Analyst. He also holds his Financial Risk Manager credential with the Global Association of Risk Professionals. Jared started his career as a retirement actuary prior to transitioning to risk management consulting. In his role as a Director in PwC's Financial Services Risk Advisory practice, his focus is in the areas of risk and capital management, ERM framework development and risk and capital regulation compliance.

Heather Adams is an Associate of the Society of Actuaries. She has worked in Reinsurance Pricing at ING Re, Corporate Actuarial at OneAmerica, and Valuation at Employer's Reassurance Corporation ("ERAC"). Heather currently works as a Risk Manager at ERAC with a focus on model governance and validation. She is also working to attain the CERA and FSA designations from the Society of Actuaries.

In this issue, Aaron Sarfatti and David Jaffe describe some of the challenges in modeling variable annuity behavioral dynamics in their paper "The VA Behavior System: Coping with Complex Interaction in Annuity Policyholder Behavior." They outline several approaches in existence for coping with these difficulties and offer a suggested modeling approach to assist actuaries in their efforts.

In "Emerging Risks: Peering Around the Bend," Max Rudolph summarizes the results of the sixth Survey of Emerging Risks, sponsored by the Joint

Risk Management Section and completed in Fall 2012. He highlights some of the top emerging risks and trends across the six years of survey data.

In the Chairperson's Corner, JRMS Vice-Chairperson, Barry Franklin tells us about some of the current research underway by the section and reveals some of the proposed research topics that we can expect in the near future.

In "An Overview of the GPS Framework for Comprehensive Strategic Risk Management," Damon Levine introduces a Strategic Risk Management system called the Goals-Progress-Strategy (GPS) approach.

April Xuemei Hou discusses some of the risks inherent in doing business across borders in "Risk Management in International Business." She describes several risk types that international companies should look out for and offers some techniques for managing these risks.

The winning essays from the "Incentive Compensation – The Critical Blind Spot in ERM Today" Call for Essays are also included in this issue. These four essays provide insights related to incentive compensation from a variety of perspectives and backgrounds.

We also provide a listing of recent articles and papers that may be of interest to the inquiring mind. These pieces span across many areas of risk management and offer additional content to those seeking further reading.

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



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# SOA 2013

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Plan to take part in these sessions, sponsored by the Joint Risk Management Section:

### **Joint Risk Management Section Luncheon**

Session 31

**Monday, Oct. 21**

11:30 a.m. – 1:30 p.m.

Learn about the rating agency view on risk management and ORSA, the approach of an external party to get comfortable with companies' ERM programs, and the impact on rating of a robust ERM program.

*This luncheon is open to all meeting attendees. There is a nonrefundable fee of \$10 for Joint Risk Management Section members and CERAs and \$30 for all others. Please include the additional fee with your registration.*

### **ERM—Where Is the Value?**

#### **Session in Brief:**

Session 124 Panel Discussion

**Tuesday, Oct. 22**

Take a critical look at current enterprise risk management (ERM) practices and results in light of recent history. Examine why ERM succeeded in some instances or may not have always added the value expected in others.

[SOAAnnualMeeting.org](http://SOAAnnualMeeting.org)

# The VA Behavior System: Coping with Complex Interactions in Annuity Policyholder Behavior

By Aaron Sarfatti and David Jaffe

**OVER THE PAST FEW** years, guaranteed variable annuity (“VA”) behavior risk has come into focus for insurance industry risk executives and actuaries, owing to a sharp increase in useful experience data coupled with several billion-dollar reserve charges attributed to VA behavior. The modeling of VA behavioral dynamics is a complex challenge for several reasons. In this short paper, we aim to help clarify one aspect of VA behavior complexity: the interactions between different behavioral assumptions and their impact on guarantee values. We first outline why this aspect of behavior assumptions is particularly challenging for models and then offer some potential approaches to dealing with the complexity.

## I. OVERVIEW OF GUARANTEED VA BEHAVIOR ASSUMPTIONS

Three behavior assumptions drive VA cash flow modeling results:

- **Lapse rate functions:** The lapse rate functions determine the projected rate of full surrender for variable annuity policyholders, including how the lapse rate responds to the moneyness of the guarantee.
- **Timing of income election:** Timing of income election refers to the modeling of the “delay period”—i.e., the number of years the policyholder will wait between the policy issue and the withdrawal period.
- **Efficiency of income taking:** Efficiency of income taking refers to the extent to which policyholders maximize the value of their guarantee by taking the maximum withdrawal each month. Withdrawals can be categorized as either “efficient,” “partial,” or “excess.” “Efficient” withdrawers withdraw the maximum amount allowed by the guarantee. “Partial” withdrawers withdraw less than the maximum (including cessations for products where the roll-up terminates post-withdrawal). Finally, “excess” withdrawers withdraw above the maximum which often results in a sharp reduction in the guarantee amount and guarantee value, as well as the value of future fees.



## II. DEFINING THE PROBLEM

One of the key challenges in VA behavioral modeling is the interaction between the behavioral risk factors

Experience to date strongly supports several interactions between behavioral risk factors. For example, policyholders who take an excess withdrawal exhibit a higher propensity to lapse than policyholders taking efficient withdrawals; those taking efficient withdrawals tend to lapse at a lower rate. This poses a particular modeling challenge given the historical practice of examining behavioral risk factors (e.g., lapse rates) in isolation from other factors, and because of the profound impact these interactions have on cash flow valuation results.



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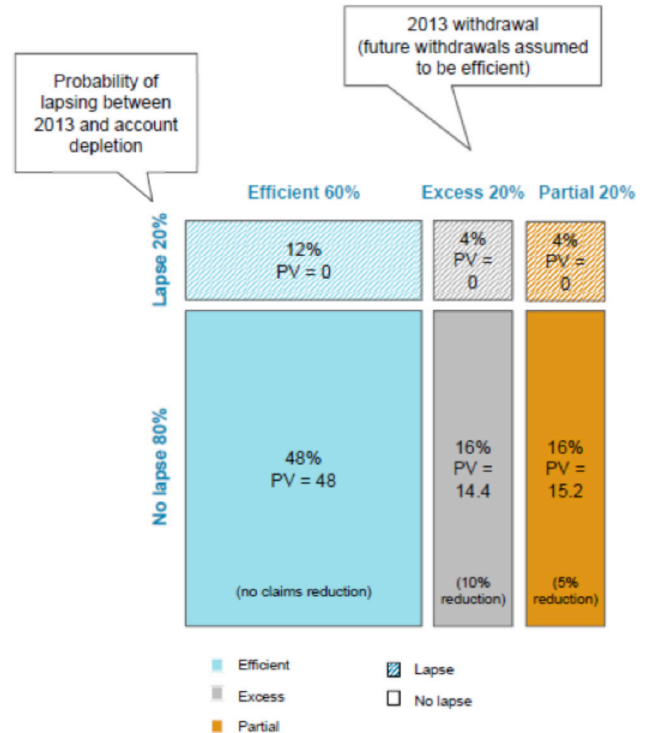
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To further explore the impact of such an interaction, consider the interaction between excess withdrawals and lapses. First, experience data strongly supports a relationship between withdrawal efficiency and lapse rates. Policyholders with excess withdrawals tend to exhibit a very high lapse propensity (with about 50 percent percent lapsing in the five year period following the excess withdrawal). Policyholders who are not withdrawing lapse at a lower rate and the lapse rate for efficiently withdrawing policyholders is lower still. This behavioral pattern is intuitive since excess withdrawals can signal a range of policyholder circumstances such as a need for liquidity, a medical condition, or suboptimal financial decision making, any of which could also trigger a lapse. Second, this interaction drives model results. Consider the following stylized examples: both model a variable annuity with the following five assumptions:

- Probability of excess withdrawal in 2013 = 20 percent (claims reduced by 10 percent)
- Probability of partial withdrawal in 2013 = 20 percent (claims reduced by 5 percent)
- Probability of efficient withdrawal in 2013 = 60 percent (no claims reduction)
- All projected withdrawals post 2013 assumed to be efficient
- Probability of lapsing prior to account depletion = 20 percent

(These parameters are stylized to illustrate the point). The first model assumes no interaction between these assumptions (excess withdrawers are just as likely to lapse as efficient withdrawers) and the second model assumes a strong interaction between excess withdrawal and lapse (excess withdrawers considerably more likely to surrender).

**Model 1 - VA guarantee claims valuation, assuming no correlation between assumptions**



Total PV = 77.6 (assumptions: PV of claims = 100 for efficient withdrawers, 90 for excess withdrawers, 95 for partial withdrawers and 0 for lapsed policies)



“ Excess withdrawals can signal a range of policyholder circumstances such as a need for liquidity, a medical condition, or suboptimal financial decision making, any of which could also trigger a lapse. ”

By ignoring the interactions between the lapse and excess withdrawal assumptions, the first model would understate the guarantee cost for a simple reason: most of the policies taking excess withdrawals, who produce lower guarantee costs relative to their more efficient counterparts, would have lapsed anyway and so their excess withdrawal would have had no impact on the valuation in any event. While the 53 basis point cost understatement may seem *de minimis*, this 53 basis points would compound for each year that elective withdrawals are taken by policyholders. With an average life of 10-15 years, this could lead to a considerable reserve mis-estimation and raise the eyebrows of management, auditors, and other stakeholders.

This compound effect complicates behavioral modeling because the actuary must not only set assumptions but the degree of interactions between assumptions.

### III. MODELING SYSTEM CRITERIA

No model can perfectly describe reality and VA behavior is a prime example of this for the reasons above. Choosing from a range of possible imperfect models, we suggest the following criteria to evaluate the quality of a chosen model:

- **Accuracy:** The model must correctly return the quantity being measured, at the level of precision required.
- **Ease of implementation:** The model must not be overly complex as to be intractable.
- **Monitorability:** The model must be sufficiently transparent that results and attribution can be communicated and monitored; a particularly important characteristic given the complexity of the model.

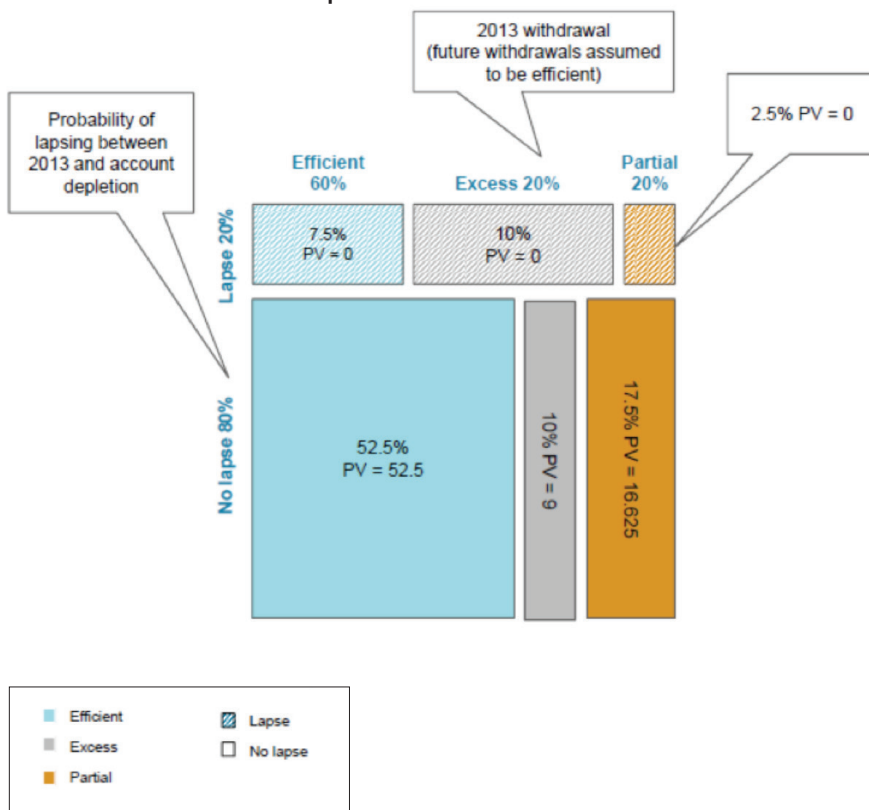
### IV. SUGGESTED APPROACH

In the market today, we observe three common approaches employed by actuaries to cope with the interactions between VA behavior assumptions:

1. The “simplified approach”: Assume no interaction between behavioral risk factors

Some actuaries altogether eliminate the model complexity by ignoring the interactions of risk factors.

**Model 2 - VA guarantee claims valuation, assuming correlation between assumptions**



Total PV = 78.125

Because of its simplicity, this approach meets our ease of implementation and monitorability criteria, but, as noted above, can lead to gross mischaracterization of liability, failing the accuracy criterion. We believe that this approach can be used if all standalone behavioral risk factor are set conservatively and when a reasonable degree of model output precision is not required. This also needs to be adequately understood and communicated to model results users.

2. Explicitly model the interactions via a “Markov chain”

Under this approach, the actuary explicitly reflects the correlations between assumptions with a Markov chain. The actuary would define various “states” for a

CONTINUED ON PAGE 10

variable annuity such as (1) “no withdrawal,” (2) “efficient withdrawal,” (3) “partial withdrawal,” (4) “excess withdrawal,” (5) “lapse,” and (6) “death,” and define the state-to-state transition probability for each pair, thereby explicitly capturing the interactions between assumptions. This approach passes the accuracy test but performs weakly on the ease of implementation and monitorability criteria. Because a different set of assumptions is required for every state-to-state transition, and the states are very numerous, the model risks becoming intractable. The many state-to-state transitions to be modeled would include:

- The six states noted above
- Within the excess and partial withdrawal states, further buckets to distinguish different levels of excess and partial withdrawals (e.g.—excess, severe excess etc.)
- Potential further bucketing based on behavior in the year before last, if this behavior is seen to be correlated in some way with future behavior
- The standard demographic and economic data actuaries use to model behavior such as age, duration, moneyness etc.

For these reasons, we believe that the Markov chain approach can provide insight into behavioral dynamics when conducting experience studies, but is not practical for full model implementation.

### 3. Results-oriented hybrid approach

The third approach is a results oriented framework which focuses on model transparency and model output accuracy, at the expense of explicit best estimate input assumptions. The process for setting assumptions is as follows:

- Establish the lapse rate function: set lapse estimates based on observed lapse experience.
- Establish the timing of income start: also known as the “timing grid,” this step determines when surviving policies begin to take income. These income takers are then modeled to be perfectly efficient.
- Set excess/partial withdrawal assumptions, but adjusted for differential lapse: Similar to the simplified approach, the hybrid approach sets absolute

inefficient withdrawal & lapse assumptions that are not assumed to interact. However, unlike the simplified approach, the hybrid approach calibrates the inefficient withdrawal assumptions to return the projected valuation results, at the expense of precisely modeling who and when a policyholder may take inefficient withdrawals. This is analogous to an actuary using mortality experience weighted by policy size. Such a mortality table is not expected to accurately predict the number of people who will die, but would instead correctly quantify the impact of mortality on the valuation. Similarly, inefficient withdrawal assumptions are “weighted” by lapse rate to arrive at a properly calibrated inefficient withdrawal assumption.

To implement the results-oriented hybrid approach, in one analytical method, which we call the “policyholder breakage method,” the actuary can supplement the traditional experience study, and its focus on demographic cohort behavioral choices, with a financial study of the historical impact of inefficient withdrawals on actual and projected claims. In this study, the actuary is not focused on the behavioral choices the policyholder made but on how these choices impacted the value of projected fees and claims. This financial quantification is called the “policyholder breakage rate.” Future policyholder withdrawal behavior can then be modeled as efficient but the breakage rate is applied as a topside adjustment to model results to capture the expected impact of future inefficient behavior on claims and fee values.

## V. CONCLUSION

Above, we summarized some of the challenges and potential solutions for guaranteed VA behavior risk management. We anticipate that this risk area will become an increasing focus for actuarial and risk management groups at VA manufacturers and that actuaries will continue to play the dominant role in managing and modeling this risk. Because of the obstacles noted in this paper, we do not believe that it will be possible to model and measure this risk with 100 percent accuracy. However, we do think that modeling approaches targeted to capturing the key dynamics at the expense of perfect accuracy will be crucial to ensuring insurance companies minimize the likelihood of further large financial restatements due to behavioral assumption unlocking. ■



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# Emerging Risks: Peering Around the Bend

By Max J. Rudolph



**Max Rudolph**, FSA, CERA, MAAA, is owner of Rudolph Financial Consulting, LLC in Elkhorn, Neb. He can be reached at [max.rudolph@rudolph-financial.com](mailto:max.rudolph@rudolph-financial.com).

## DEALING WITH EMERGING RISKS

is a key component of enterprise risk management (ERM). Risk managers should consider risks that develop over a long time horizon, in

addition to the short term risks involved with tactical planning and putting out fires. Emerging risks focus on outliers—extreme events that do not occur frequently. Regulatory capital requirements tend to ignore these outliers in their calculations. This does not mean they won't occur, and makes it important for an entity's internal risk team to fill this gap. They use tools like stress tests and qualitative assessments to interpret the impact of these outliers.

This article reviews the sixth survey of Emerging Risks, sponsored by the Joint Risk Management Section and completed in fall 2012. Trends are as important as absolute responses, and the research sees value in comparing against past results. The complete survey can be found at <http://www.soa.org/research/research-projects/risk-management/research-2012-emerging-risks-survey.aspx>.

Risk managers reported in the survey that risk tools are being used more frequently to improve decision making. These incorporate quantitative and qualitative methods. Stress testing is being used to supplement economic capital calculations and consider alternative investment strategies and product designs. Scenario drivers include economic factors, improved building

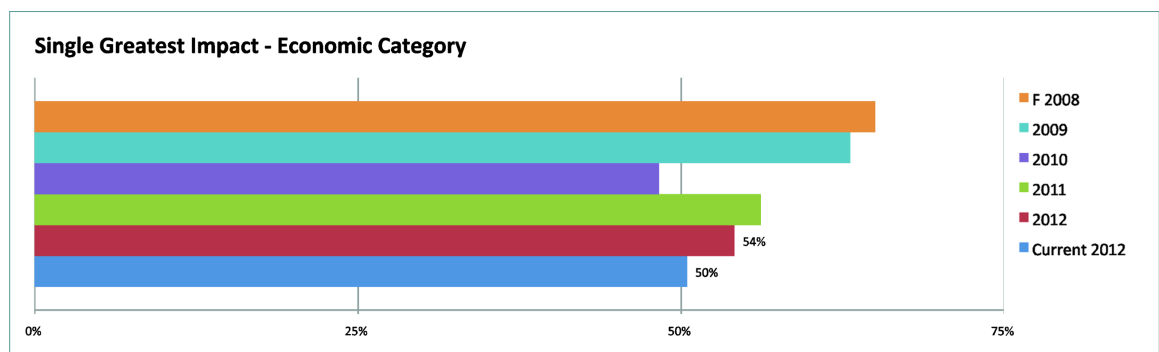
codes and rapidly improving cyber risk analysis. They report a balance needed between sophisticated models and simplified techniques based on experience to identify emerging risks and other potential outlier events.

## COGNITIVE BIAS

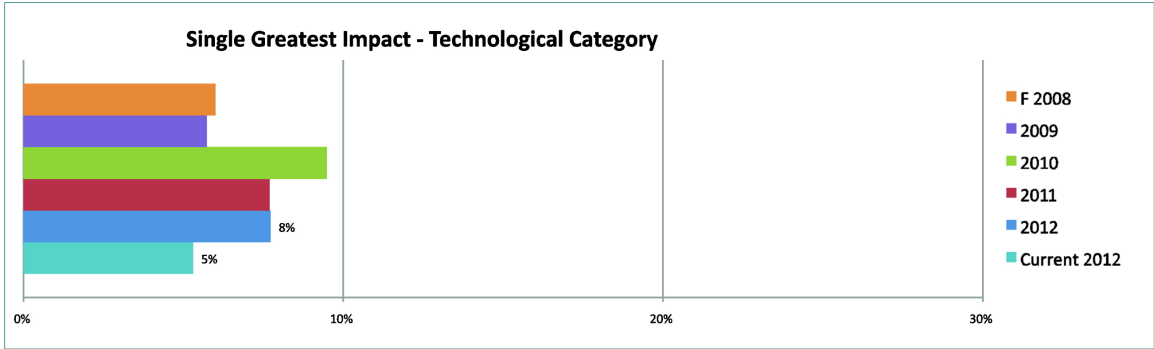
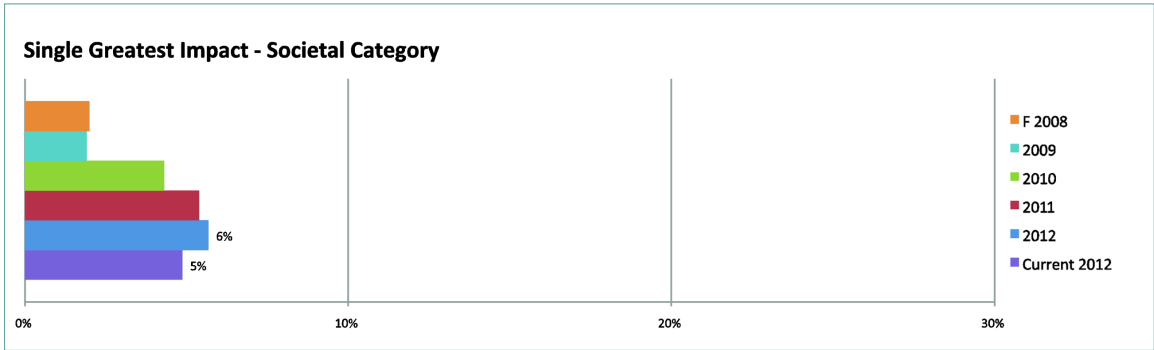
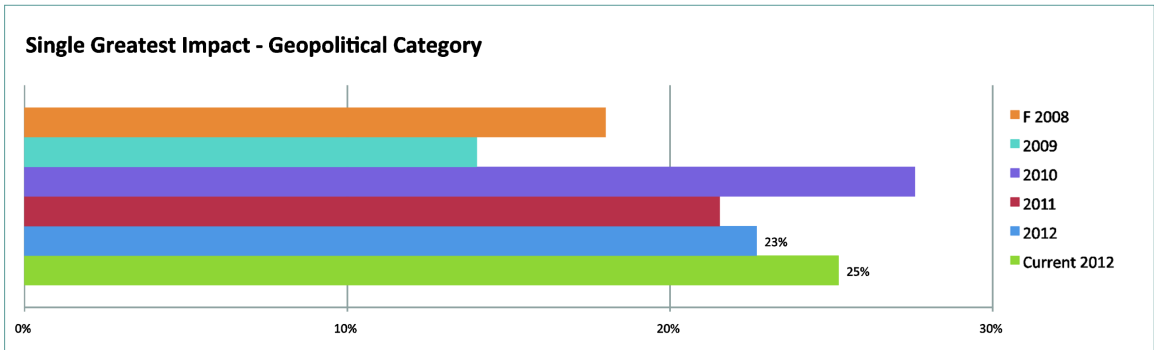
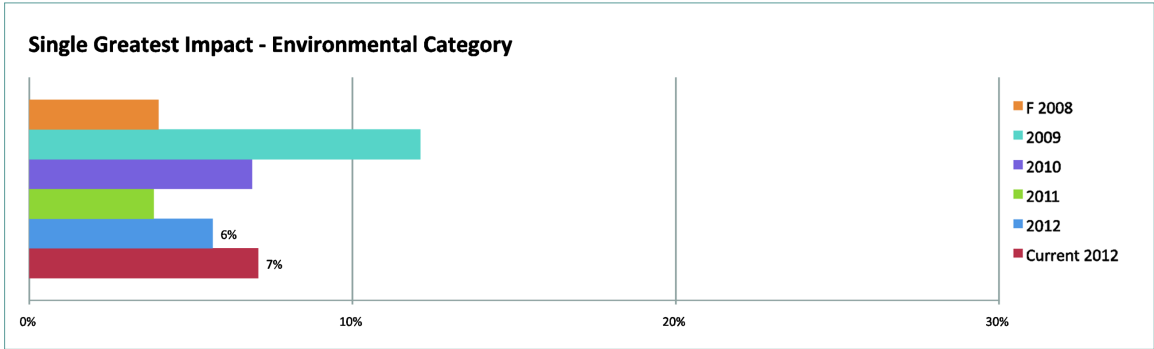
In the past this emerging risks survey has considered anchoring bias as described in Prospect Theory by Daniel Kahneman and Amos Tversky (summarized in Kahneman's *Thinking, Fast and Slow*).

Since the previous iteration of this survey in fall 2011, a number of events have influenced the thinking of risk managers. Reverberations still echo from the 2008 financial crisis, but less so from the 2011 Japanese earthquake/tsunami and Arab Spring. The continuing European financial crisis combined with weather related events like storms and drought, but no event led to wide-spread contagion.

The evolving field of behavioral finance describes anchoring as the tendency to let recent events influence our thinking about potential events. Previous survey reports discussed the impact on results when the Mumbai terrorist attacks occurred while the survey instrument was open and *International terrorism* became a popular choice. In 2012 the survey closed shortly before Hurricane Sandy came ashore in the U.S. Northeast, avoiding what would have been another interesting data point. We continue to see evidence of anchoring. Three risk categories show strong results that move percentages from last year's survey results toward today's top current risk, as seen in the charts describing Economic, Environmental and Geopolitical categories.







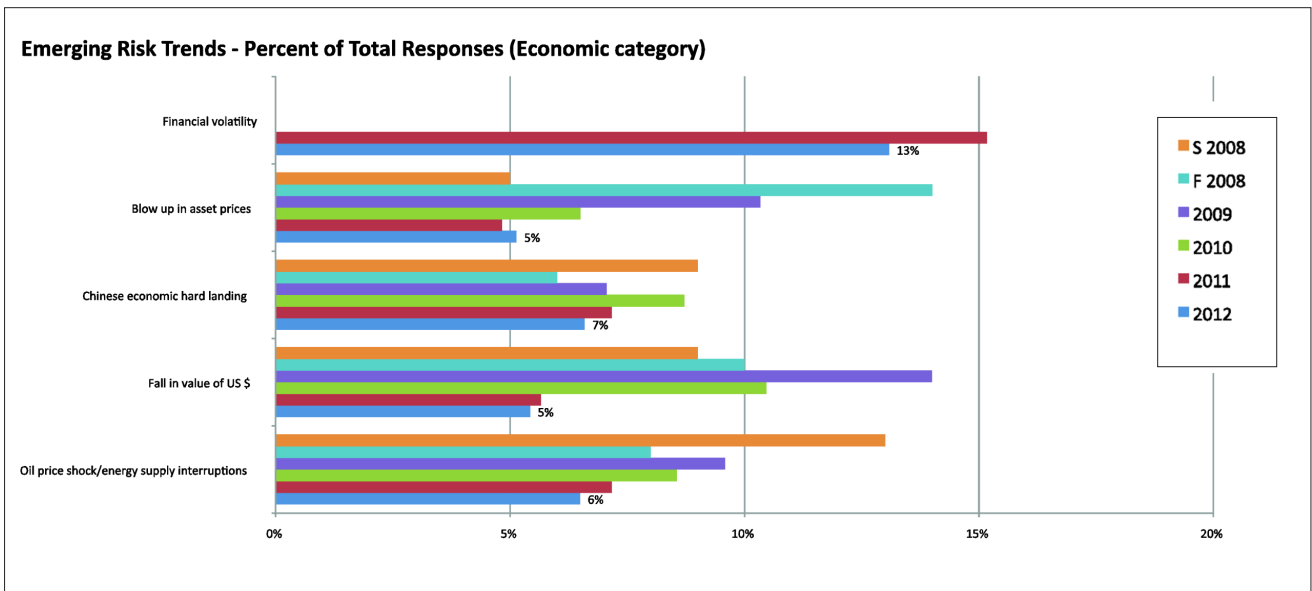
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There were some interesting shifts in the 2012 survey results. The Economic category of risks continues to be the top emerging risk choice (respondents could pick up to five), ahead of the Geopolitical, Societal, Technological and Environmental categories. As time passes from the financial crisis, the Economic category's importance is fading. Finishing a strong number two (32% versus 37% for the Economic category), Geopolitical risks increased. Risks with new highs across the survey history were *Loss of freshwater services* (11%), *Interstate and civil wars* (14%), and *Liability regimes* (8%). New lows were recorded by *Oil price shock* (31%), *Chinese economic hard landing* (31%), *Pandemic/infectious diseases* (12%), *Natural catastrophes: Inland flooding* (1%), and *Natural catastrophes: Earthquakes* (2%). Despite recording new lows, some of these risks remain in the top ten overall.

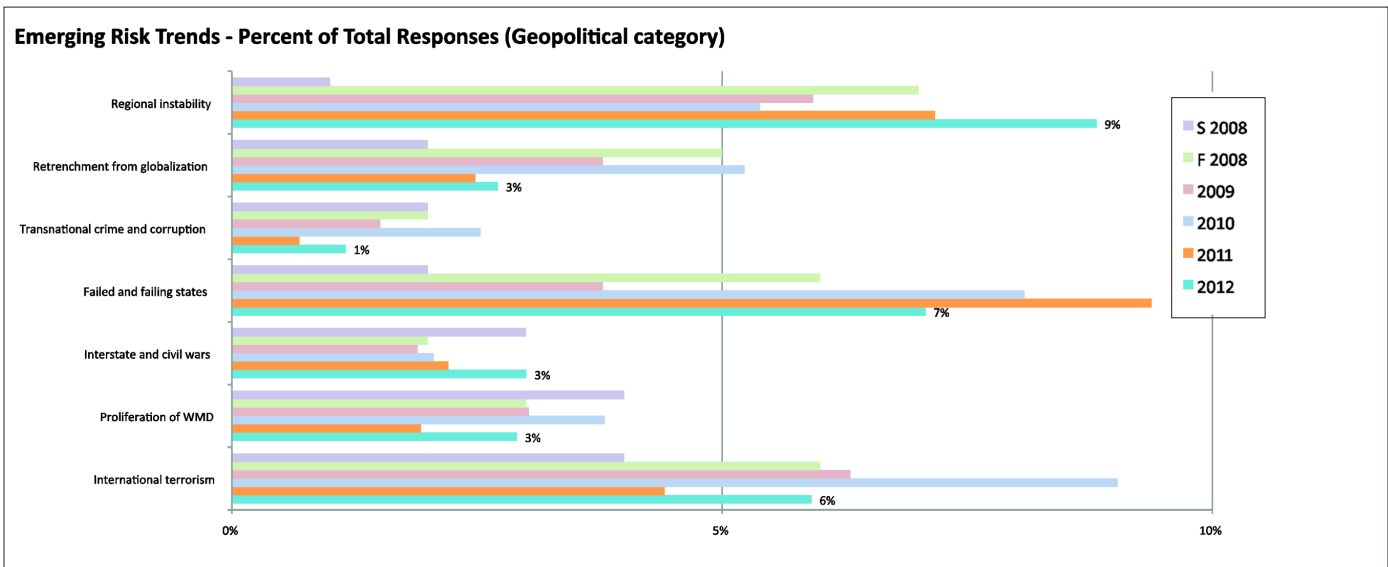
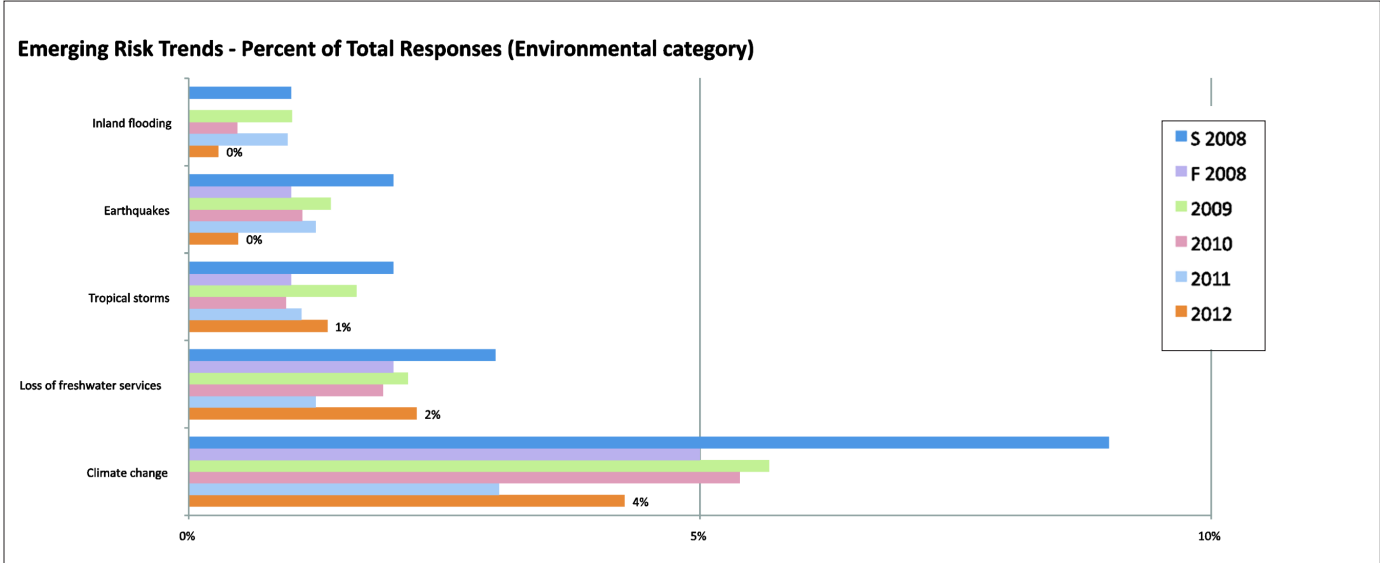
Top Results from 2012 Survey

1. *Financial volatility* (62%)
2. *Regional instability* (42%)
3. *Cyber security/interconnectedness of infrastructure* (40%)
4. *Failed and failing states* (33%)
5. *Chinese economic hard landing* (31%)

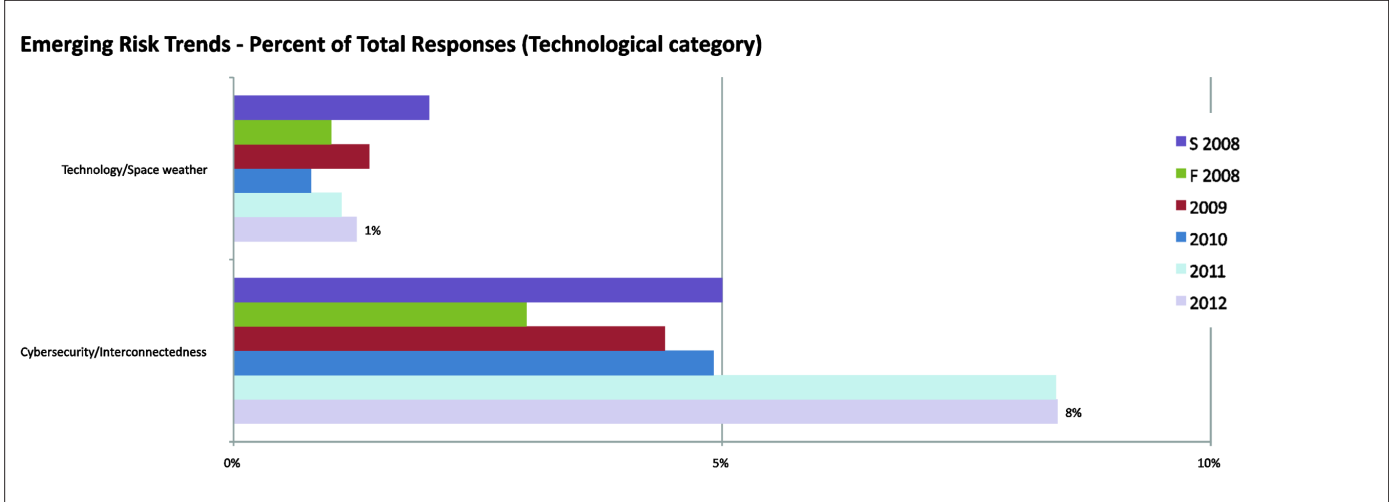
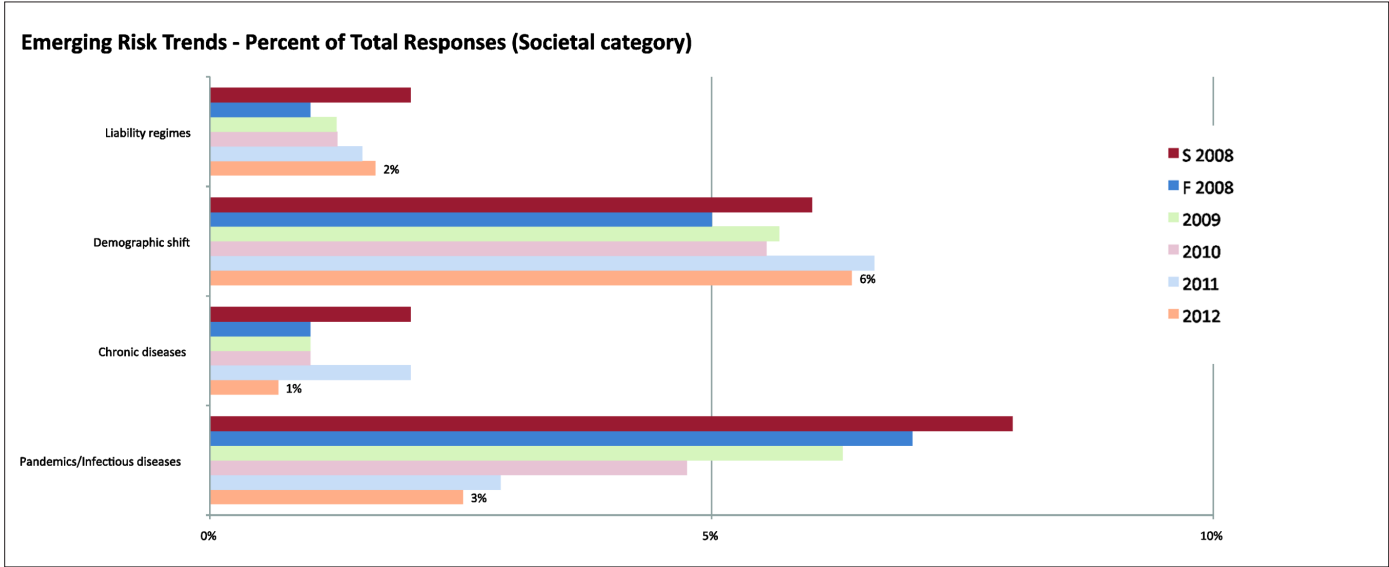
The following charts show historically the results by category and risk.



“The Economic category of risks continues to be the top emerging risk choice ...”



CONTINUED ON PAGE 16



## RISK COMBINATIONS

One of the more interesting debates among ERM practitioners is how to consider interactions between risks. To enhance knowledge in this area the survey asks about concerns due to combinations of two risks. Five of the top six combinations included *Financial volatility*, chosen with *Oil price shock* (5%), *Blow up in asset prices* (5%), *Chinese economic hard landing* (4%), *Failing and failing states* (3%), and *Fall in value of US \$* (3%). The top combination not including *Financial volatility* was *International terrorism and Proliferation of weapons of mass destruction (WMD)* with 4%, third overall.



“One of the more interesting debates among ERM practitioners is how to consider interactions between risks.”

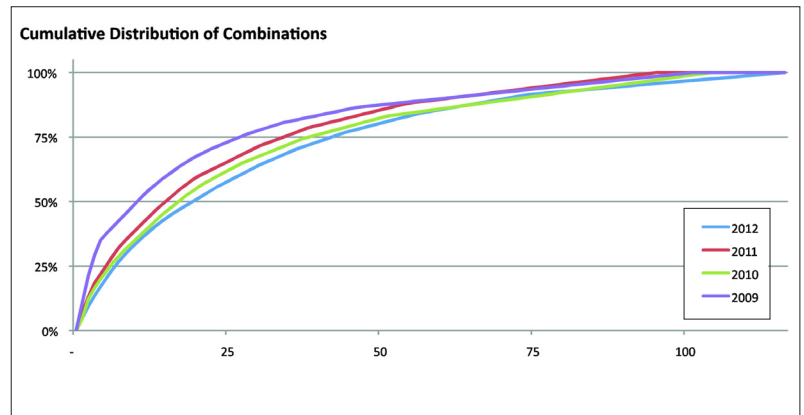
There are 253 possible two-risk combinations. The spread of results was the least concentrated so far, as can be seen in the accompanying chart. It is interesting to see that *Oil price shock*, which continues to receive less attention as an isolated risk, moved up to second place when considering its importance in combination with other risks behind financial volatility.

The period immediately following the financial crisis might be the most extreme we will see, so 2009 is used as the base year with a 100% Risk concentration ratio. Comparisons are made at the 25<sup>th</sup> percentile, median (50<sup>th</sup> percentile) and the 75<sup>th</sup> percentile, and then combined. A higher number reflects greater concerns. As a relative measure, the Risk Concentration Ratio represents the current feeling among the risk management community. The survey respondents seem to be less focused on a potential crisis this year.

## LEADING INDICATORS

Best practice approaches to incorporate leading indicators in action plans improved this year. A lagging key risk indicator uses information such as quarterly revenue. A leading indicator provides information earlier in the process. Examples would include instances of longer than expected lines on the first day of a holiday shopping season reflecting retailer success or a spike in the credit default spread for a supplier reflecting credit risk. Over half (57%) reported having at least some leading indicators around emerging risks. Examples reflected a move to incorporate triggers and thresholds, such as to help manage a liquidity crisis by putting in place mitigating actions well in advance of the event.

Respondents said that a blend of quantitative sophistication and qualitative analysis is needed. One respondent reflected the general tone of comments by stating: *We have come to the conclusion that for emerging risks it is far more informative and worthwhile to do stress tests based on scenarios developed specifically for the risk. Trying to use stochastic processes on a risk that is not well understood can lead to a false sense of security and can be misleading.*



## CONCLUSIONS

Emerging risks can be difficult to effectively manage. Unintended consequences and interactions with other risks are only understood in hindsight, so risk “experts” who profess complete knowledge and a cookie cutter approach should be treated with suspicion. Behavioral finance is a key to interpret emerging risks, especially the impact of anchoring. Recent concerns greatly influence future concerns. For example, as the time since the worst of the financial crisis passes, respondents seem to broaden their focus.

According to survey results, ERM is at a crossroads. Many are being asked to do more without additional funding. Some complete the bare minimum to deflect external stakeholders. Others find their efforts receiving more exposure but not in ways that add value. Happily, some best practice firms have incorporated risk into their strategic planning process. By extending their time horizon and seeking out alternative perspectives as they analyze their risk profile, this creates a competitive advantage. Current challenges like low interest rates may create an opportunity to identify bubbles and other mispriced assets and liabilities by being skeptical and studying history. As they say, history may not repeat but it often rhymes. ■

# An Overview of the GPS Framework for Comprehensive Strategic Risk Management

By Damon Levine

## INTRODUCTION

This article introduces the Goals-Progress-Strategy (GPS) approach to Strategic Risk Management (SRM) with the following objectives: 1) increase the likelihood of attaining strategic objectives, 2) ensure transparency and buy-in from management, risk experts, and strategic planners, and 3) enable “adaptive management”: timely and informed adjustments to business tactics, risk mitigations, strategic considerations, and a more objective basis for any termination decisions.



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GPS is a comprehensive SRM system in that, for a company’s strategic objectives, it enables:

- a portfolio view of risk and reward
- a concept of strategic risk capital
- risk appetite formulation
- risk-reward based capital deployment
- risk-adjusted compensation

GPS is *scalable* in the sense that these critical concepts are purely “optional” and can be realized as straightforward “add-ons.”

## KEY CONCEPTS AND THE EXECUTION MANAGEMENT CYCLE

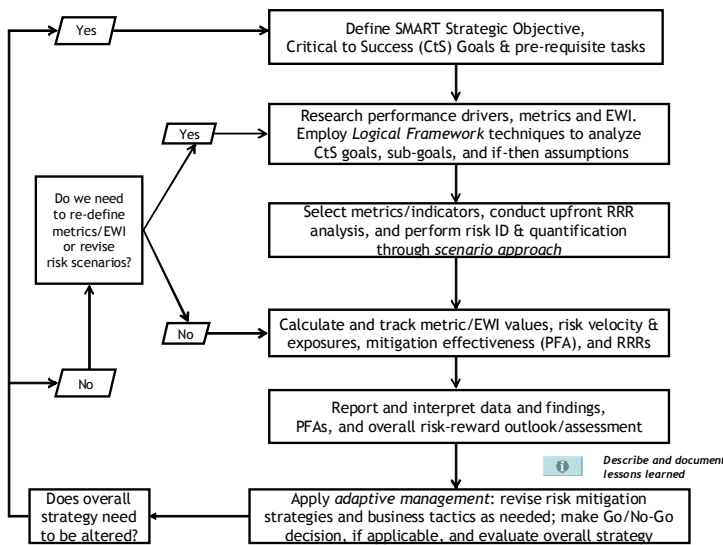
GPS employs a *scenario-based approach* to strategic risk identification and quantification. For a risk source of relevance to a strategic objective, subject matter experts provide a set of scenarios representing several ways the risk might manifest. Each scenario includes probability estimates and impact approximations for income statement or balance sheet components, leading to quantification in terms of key risk metrics (e.g., effects on GAAP earnings, company value, capital, etc.) GPS makes use of frequent use of several additional concepts which are now described in turn.

When a risk manifests, how long will it be before the company experiences some type of impact? This “speed of onset” is referred to as *risk velocity*. Hurricane risk, for example, is generally viewed as having high risk velocity while a risk relating to phased in health care regulations is potentially a low velocity risk.

*Potential for Action* (PFA) is a measure (possibly qualitative) of the expected benefit to the company’s risk-reward profile from *additional* focus or effort on risk mitigation.

For an underperforming strategic objective, the *Required Recovery Ratio* (RRR) gauges how much “catching up” is needed to achieve the initial baseline

Exhibit 1: Illustrative GPS Process Flow



“We may then simulate the objective’s performance in a way that links it to macro factors.”

or best-estimate projection for the strategic objective. Assume success of an objective is defined solely by an earnings metric. The baseline might be \$100M over the three years of the objective’s time horizon with annual projections of \$25M in year 1, \$35M in year 2 and \$40M in year 3. Suppose \$15M is earned in year 1 so that we must outperform the remainder of the baseline forecast to still meet the aggregate objective of \$100M. RRR is the ratio of required future performance versus the baseline projection (for the remaining years) that ensures we will still meet the aggregate goal:  $15 + \text{RRR}(35 + 40) = 100$ . In this case,  $\text{RRR} = 113.33$  percent.

Before pursuit of the objective begins in earnest, several values of RRR are examined. We analyze several possibilities *today* for being “behind plan” *in the future*. We examine such deficits in various amounts and at several points in the objective’s time horizon. This upfront analysis helps to inform future termination decisions, if applicable, and helps remove some emotion from the process. In all too many cases the default assumption is to soldier on despite a clearly doomed objective. One must not be lulled into a “sunk cost” argument. In most circumstances there is additional effort and expense that is required to continue to pursue an objective and that additional capital and resource commitment must be carefully considered.

GPS derives its name from its three main phases: Goals-Progress-Strategy:

- **Goals:** Clearly articulate the strategic objective and define “critical-to-success” (CtS) goals which are essential for attainment of the objective. Research and propose relevant performance drivers, risks to goals, associated mitigations, and metrics to assess these factors.
- **Progress:** Set progress measures, early warning indicators (EWI), and risk exposure and risk mitigation assessment metrics. Measure and track metrics/EWI, risk velocities, risk exposures, PFAs, and inform the success outlook through RRR. Report findings to management.
- **Strategy:** Based on the report findings, PFA, RRR, and success outlook, management refines strategic

elements such as business tactics, risk mitigations, “go/no-go” decisions (if applicable) or overall strategic course. This is the promised adaptive management. If overall strategy is to be altered then the process returns to the Goals Phase, otherwise it returns to the Progress Phase. This Execution Management Cycle is illustrated in Exhibit 1 on p.18.

## SIMULATION OF STRATEGIC OBJECTIVE PERFORMANCE

A standard technique for simulation using a discrete set of scenarios employs a random number drawn from a uniform (0,1) distribution. The general idea is that for a given risk source modeled with scenarios  $S_1, S_2, \dots, S_k$  with probabilities  $p_1, p_2, \dots, p_k$  (with  $p_1 + p_2 + \dots + p_k = 1$ ) we may simulate which scenario occurs by generating a random number from (0,1). If this random number is  $r$  we simply use the rule: if  $r < p_1$  then  $S_1$  occurs, if  $p_1 < r \leq p_1 + p_2$  then  $S_2$  occurs, if  $p_1 + p_2 < r \leq p_1 + p_2 + p_3$  then  $S_3$  occurs, etc.

In this section we will first use this concept to simulate a set of macro factors, or the “state of world”. This state of the world will tell us which set of conditional probabilities is to be used for each and every risk source modeled for the strategic objective of interest. We may then simulate the objective’s performance in a way that links it to macro factors.

As a simple example, assume we have a strategic objective whose success primarily depends on two risk sources: customer disposable income and the ability to change product pricing on a frequent basis. We create risk scenarios for each of these risk sources. We use the symbol  $S_d$  to represent the scenario analysis performed for disposable income risk and  $S_p$  for that of pricing flexibility risk.

Assume that  $S_d$  has three sets of conditional probabilities for its scenarios, corresponding to each of these economic states: recovery, minor slowdown, or depression. Pricing flexibility may depend on both the fate of a proposed regulation as well as the state of the economy. Perhaps  $S_p$  has four sets of probabilities for its scenarios, corresponding to these future macro states: 1) a particular proposed regulation becomes

CONTINUED ON PAGE 20

law in 2013 *and* there is an economic recovery, 2) the proposed regulation becomes law in 2013 *and* there is not an economic recovery, 3) the proposed regulation does not become law in 2013 *and* there is an economic recovery, 4) the proposed regulation does not become law in 2013 and there is not an economic recovery. The simulated macro state (1,2,3, or 4) determines which probability assumptions are to be used when pricing flexibility is simulated.

Our macro factor scenarios include estimated probabilities for each of the modeled states. Macro factor based simulation for the performance of this strategic objective may then be carried out through the following process:

1. Generate two independent random numbers from a uniform distribution over (0,1): r1 and r2.
2. Based on r1 simulate the state of the economy, and based on r2 simulate whether or not the proposed regulation becomes law.
3. Based on the economy state and regulation result from (2), determine the activated sets of probabilities to be used when simulating customer disposable income and pricing flexibility.
4. Generate two independent random numbers from a uniform distribution over (0,1): r3 and r4.
5. Based on r3 and  $S_d$  simulate the scenario for disposable income. Based on r4 and  $S_p$  simulate the scenario for pricing flexibility. In each case the activated probabilities are known from (3).
6. Aggregate the effects of the simulated scenarios from (5) to simulate strategic objective performance.

## THE PORTFOLIO VIEW

If enough macro factors are identified and properly analyzed then we may simulate the performance of all a company's strategic objectives in this manner. In other words, we are able to model the behavior of the *portfolio* of strategic objectives in response to the simulated macro conditions.

We must look at the full list of key risks (those with

modeled scenarios) faced by any of our strategic objectives and determine the macro factors which would influence our perceived likelihood of *any* of the modeled scenarios. The "usual suspects" for the insurance industry include the economy, federal and state regulatory action, pandemics, and hurricanes.

We can describe the *distribution* of potential performance of any objective in our portfolio. Percentiles and confidence intervals for a specific objective's metrics or the objective's contribution to company metric variation are straightforward to obtain from the simulation output.

## RISK CAPITAL AND RISK-ADJUSTED RETURN FOR STRATEGIC OBJECTIVES

For each simulated performance of a strategic objective "X," the modeled levels of the key metrics can be compared to their corresponding levels in the baseline or best-estimate forecast. Suppose our only metric of interest is annual earnings over a three year time horizon and the baseline forecast (in \$M) is: 100, 150, and 200 for years 1-3 respectively. We apply the macro factor based simulation a single time to get these simulated annual earnings for objective X: 80, 140, and 230. We have shortfalls of 20 and 10 for years 1 and 2, respectively, and year 3 was an excess of 30 versus baseline. Assuming end-of-year timing, the present value, PV, of these differences is:

$$PV = 20/(1+i) + 10/(1+i)^2 + (-30)/(1+i)^3$$

This present value can be thought of as a notional "infusion" that gets actual performance back on track. In the above expression,  $i$  is a discount rate, possibly related to an estimate of the company's weighted average cost of capital or an opportunity cost. For the "kth simulation" we denote the simulated earnings, for years 1-3 respectively, by  $E_{1,k}$ ,  $E_{2,k}$ , and  $E_{3,k}$ . Assuming the baseline earnings are  $B_1$ ,  $B_2$ , and  $B_3$  the kth infusion is:

$$k^{th} \text{ infusion} = (B_1 - E_{1,k}) / (1+i) + (B_2 - E_{2,k}) / (1+i)^2 + (B_3 - E_{3,k}) / (1+i)^3$$

In the run of several thousand such simulations we determine the 95th percentile (for example) of these infusion amounts. If we are able to do another run with the same number of simulations and the observed 95th



“ ... this type of information shows which objectives provide diversification benefits and allows for an attribution of the portfolio risk-adjusted return to its constituent objectives. ”

percentile is (approximately) the same as that of the first run, then we define that common value to be the risk capital for objective X. We ensure the number of simulation is large enough to lead to stability of results. We may also compute the infusions on a portfolio level by aggregating all objectives baselines and then running simulations. We can then define *the risk capital for the portfolio* of strategic objectives.

By repeating that simulation with one objective held constant at its baseline projection levels in every simulation (“zero risk”) we may then observe if the portfolio risk capital is more or less than when this objective’s performance had been simulated along with that of all the other objectives. This may be used for identification of risk-reducing objectives or risk-increasing objectives. Additionally, one may use these concepts to allocate overall portfolio risk to each objective.

risk-adjusted return of objective X = average impact in company value due to X / risk capital of X

This is an example of a so-called RORAC measure since it measures “return on risk-adjusted capital”.

One may also use simulation to derive the RORAC for the portfolio of objectives. The simulation can then be repeated with one objective being set to have zero risk (always producing its baseline forecast) and we may then observe the change in risk-adjusted return of the portfolio. Again, this type of information shows which objectives provide diversification benefits and allows for an attribution of the portfolio risk-adjusted return to its constituent objectives.

### PARTING THOUGHTS

GPS offers a robust and intuitive approach to SRM. By using the scenario approach and risk content based on subject matter expert knowledge, buy-in is ensured by design. Further aspects and more detail of the framework can be found in the full paper available at <http://www.erm-symposium.org/2013/pdf/erm-2013-paper-levine.pdf>.

*Disclaimer: The views expressed in this article are my own and not necessarily those of my employer, Assurant Inc. ■*

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# Risk Management in International Business

By April Xuemei Hou

**WITH THE ADVANCE OF** technology, communication and transportation has improved tremendously, thereby pushing forward the development of international business. In the age of globalization, the line between “foreign” and “domestic” investing has become increasingly blurry. However, investing in foreign markets takes on additional risk, as well as opportunities, compared with what investors normally face when investing at home. This article outlines two of the most significant risks in international business and describes risk management techniques for confronting them.

- **Currency Exchange Rate Risk** is a financial risk posed by an exposure to unanticipated changes in the exchange rate between two currencies. The exchange rate between currencies fluctuates over time, and can lead to unexpected gains or losses. Currency exchange rate risk includes transaction exposure, economic exposure, and translation exposure.

## 1. Transaction Exposure

A firm has *transaction exposure* whenever it has contractual cash flows (receivables and payables) whose values are subject to unanticipated changes in exchange rates due to a contract being denominated in a foreign currency.

Transaction Exposure Example:

An American company borrows ¥100 million for a term of 1 year at effective annual interest rate of 3% in the international financial market. After getting the loan, the company changes ¥100 million into \$1 million at the current exchange rate  $\$1 = ¥100$ . One year later, the company needs ¥103 million to repay the Yen denominated loan. If the exchange rate between Dollar and Yen has changed to  $\$1 = ¥90$ , then the company will pay about \$1,144,444 to buy ¥103 million. Actually, the company will pay about \$144,444 more and the real effective annual rate is  $(1,144,444 - 1,000,000) / 1,000,000 * 100\% = 14.44\%$ .

## 2. Translation Exposure

A firm’s translation exposure is the extent to which its financial reporting is affected by exchange rate movements. Translation risk involves the revaluation of foreign assets that are held in a foreign currency because

foreign currency exchange rates vary over time. This kind of revaluation will create an exchange loss or gain.

Translation Exposure Example:

A Chinese company has \$1 million in its current account in a bank, the exchange rate is  $\$1 = ¥6.14$ , which equals 6.14 million Chinese Yuan. If the dollar depreciates and Chinese Yuan appreciates, say the exchange rate  $\$1 = ¥6$ , then the \$1 million can be transferred into ¥6 million. During the translation, the money in the current account has reduced by 140,000 Chinese Yuan.

## 3. Economic Exposure

*Economic exposure* (also known as *operating exposure*) is the risk of a company’s market value changing from unexpected exchange rate fluctuations. When the currency exchange rate rises or falls, the cost of production and sale price can be affected by the change which may in turn affect profits.

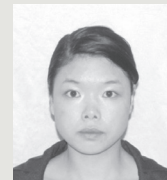
- **Country Risk** includes political risk and economic risk that may affect its businesses and result in investment losses

### 1. Political Risk

*Political risk* can be defined as the risk of losing money due to changes that occur in a country’s government or regulatory environment. Acts of war, terrorism, trade barriers and military coups are all extreme examples of political risk.

### 2. Economic Risk

*Economic Risk* is the risk associated with a country’s financial condition and ability to repay its debts. Economic indicator movements in the foreign country such as GDP, unemployment, purchasing power, inflation, etc. are important measurements for economic risk.



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## RISK MANAGEMENT TECHNIQUES

The first step in risk management is to identify the risk. Discussed below are strategies for foreign currency exchange risk management and country risk management:

- **Foreign Currency Exchange Risk**

First, if you have the option to select the billing and pricing currency, consider your national currency to conduct the business. This way you can eliminate exchange risk however many companies may not have this option. If not, add a margin buffer to any invoice quoted in a foreign currency or create a contract by which the buyer and seller share the risk of significant fluctuations in foreign exchange rates between the time the invoice is generated and the date on which the payment is made.

Second, utilize financial instruments like forwards, futures, and options to hedge the risk. Some of the most commonly financial instruments and are discussed below:

1. **Foreign Exchange Forward**

In the forward contract, the amount of the transaction, the delivery date, and the exchange rate are all tailored in advance, no exchange of money takes place until the actual settlement date. The two parties in the contract have the obligation to buy and sell in foreign currency. Foreign exchange forward contract is a way of locking in the foreign exchange rate.

2. **Currency Future**

Currency future is somehow similar to foreign exchange forward which determines a delivery date, the size of the contract and a fixed foreign exchange rate. However, there are some important differences between them. The most obvious one is that the price of the contract changes daily in currency future. For forwards, there is only one transfer at maturity date. Compared with forward contracts, future contracts avoid default risk which possibly takes place in forwards.

3. **Currency Option**

A currency option is a contract that allows the contract holder to have the right to buy or sell the currency at an agreed price. American options permit the holder to

exercise the option any time before the expiration date. In contrast, European options only permit the exercise of the option at the expiration date. The advantage of currency option is that the holder does not have to buy the foreign currency in the agreed price in the contract when the market foreign currency exchange rate is lower than the agreed the price. However, the cost of buying the options is much higher than forwards and futures.

- **Country Risk Management**

Before investing in a foreign country, investors should assess the possibility of the investing country's political risk (the stability of politics and attitude towards foreign investment) or estimate the foreign country's current economic condition and future development via foreign country's GDP, unemployment rate, purchasing power, inflation. Using this information, investors can then predict how much loss the political or economic risk might bring. After the assessment, if the investing country satisfies the investing condition, the investor should negotiate the investment environment and draft an investment agreement. After all the pre-investment work, the investor also can look for investment insurance to lower the risk.

## CONCLUSION

In international markets there are more risks to carry, however at the same time, there are more potential gains you can receive. Before you decide to invest in a certain country's market, ensure you understand the currency exchange rate and political risks associated with the investment by performing due diligence on the country's economic, political and cultural condition.

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# Management is Needed – Not Incentive Compensation

By Dave Ingram

*Note: This essay won first prize in the “Incentive Compensation – The Critical Blind Spot in ERM Today” Call for Essays, sponsored by the JRMS.*

## “MANAGEMENT MUST MANAGE. AN INCENTIVE COMP FORMULA WILL NOT BE SUFFICIENT.”

Many theoreticians and more than a few executives take the position that incentive compensation is a powerful motivator and therefore it follows directly that careful crafting of the incentive compensation program is all that it takes to get the most out of a company’s management team.

As an actuary working in a life insurance company where the executives believed that the right incentive comp was key, I had the experience of modeling and advising on the development of a number of incentive comp programs for the company’s distributors. Once in place, the reaction of the distributors was always similar; some people ignored the incentive comp program, some worked the program as was hoped by the designers, and a few abused the program.

For example, the company had a problem with low growth and they wanted to incent sales managers to hire new sales agents. So they added a bonus based upon the production of new hires and lightened (and in some cases eliminated) the penalty for hiring inappropriate people who were quickly unsuccessful. One sales manager figured out that simply by hiring large numbers of people who were often dubiously qualified, he could lower his unit cost of onboarding and collect that bonus on the new agent’s sales to their close friends and relatives before they flamed out. The cost of sales for that agency was 30 percent higher than the rest of the company and very few of his new hires stayed on to actually boost company growth. None of the other sales managers found that strategy desirable. And the efforts of management to design the incentives for new hires to prevent that abuse discouraged everyone else further from hiring.

Another part of the company had a new bonus program every single year. They never seemed to get what they wanted. Their top sales office head was expert at finding the path of least resistance to maxing out on bonuses often without accomplishing any of the com-

pany objectives. The big problem that division had was that the top sales manager there was a very sociable and helpful guy. As he found the sweet spot every year, he immediately shared that knowledge with all of the other sales managers. So every year they did something different than what was wanted, got their bonuses and the SVP of that division sent the actuaries off to model a new version of incentive comp, twisting and turning it to try to make it foolproof.

What is wrong with this vision of incentive compensation is the fundamental idea that somehow the right formula will motivate employees to do their best to advance the company goals by perfectly aligning incentives. Reality here is actually a complex adaptive system. Designers of an incentive compensation system are unlikely to be able to anticipate all of the variations of actions by employees, competitors, suppliers, markets and customers that can happen, even a single year out. And each action by one group causes reactions by one or all of the others.

Management must manage. An incentive comp formula will not be sufficient. This applies to all corporate goals—including Risk. And while risk managers want Risk to be featured in incentive comp programs, it is not necessarily the most important thing for most companies in most years.

Businesses have a hierarchy of needs along the lines of Maslow’s Hierarchy of Needs for people. First in that hierarchy is the need to have a product or service that people will pay for. Second is the need to be able to deliver that product or service at a cost that is less than what their customers will pay. Once those two basic needs are satisfied, businesses become potentially valuable. The third need of a business then is to create some reliability of the profits of the firm through some form of risk management. When the first three needs are met, then the firm definitely has a value. The fourth need then is to increase the value. Increasing the value requires that the firm achieve some combination of increases to the amount of business (need 1), the margin on the business (need 2) and/or the reliability of

CONTINUED ON [PAGE 26](#)



the profits (need 3). There may also be a fifth and sixth needs for businesses, similar to “esteem” and “self-actualization” in Maslow’s hierarchy, but that goes far beyond the scope of this discussion.

In many cases, plans to increase value will actually decrease one or two of the three elements to accomplish enough improvement in the third element to achieve overall value growth. Flawed plans that do not consider all three elements will often not actually deliver growth of value.

Which brings us back to the call for Risk to be included in incentive comp. Employees need to understand the firm’s strategies for satisfying all four needs. But it is usually much too complicated for incentive comp formulas to reflect all four needs. That is where management comes in. Management needs to fully understand that the one thing that is emphasized in incentive comp is NOT the only need of the business. They need to communicate the multiple needs and strategies to achieve those needs to the employees that are under incentive comp programs. And they need to provide ongoing feedback to all of their employees about how their actions enhance or detract from the businesses ability to meet all four of those needs.

Business managers cannot just set the right incentive comp formula and then put their feet up. It is especially important for managers to make sure that they clearly communicate that there are other goals of the company

that are not considered in the incentive comp. The “set the formula and walk away” approach leaves the employee with an airtight argument when they abuse the incentive comp system, that they thought that they were doing what the company wanted from them. Employees who have the authority to put the health of the firm at risk need to have a clear expectation that doing so in a way that is inconsistent with the risk appetite and risk management program of the firm have not just their incentive comp, but their entire compensation at risk.

The root problem that needs to be addressed is the problem of allowing highly paid employees to work as if only one of the four needs is important. Their incentive comp amplifies this wrongheaded job description. If the job description is fixed, the incentive comp can be just a nudge to increase emphasis on one of the four corporate needs. But that needs to be coupled with true management of those employees with all four corporate needs in mind. ■



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# Incentive Compensation/Risk Management - Integrating Incentive Alignment and Risk Mitigation

By Rick Beal, Alex Weisgerber, Claudia Poster and Esther Becker

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Insurance companies' risk management practices came under great scrutiny as a result of the financial crisis. Ensuring that the structure of incentive compensation does not promote unnecessarily risky behavior has been the subject of many recommendations by regulatory agencies, Congressional mandate and commentary from professional organizations. At times, it seems these efforts may be aimed at trying to create (and enforce on the industry) one "perfect" incentive plan.

No single incentive design can fit every circumstance. However, organizations that follow a set of key principles can design effective incentive plans that align with organizational strategy, motivate individuals and teams to achieve incremental performance, and incorporate appropriate risk-adjusted design safeguards.

## FIRST UNDERSTAND THE RISK CONTEXT

Before a balanced incentive plan can be designed, the organization must identify its material financial, operational and strategic risks. In short, it must have in place the basics of an Enterprise Risk Management (ERM) framework. Many organizations use historical incident/loss analysis, modeling and other tactics to better understand all of these risk areas.

Identifying employees who have the potential to expose the company to material adverse risk is another essential step. The Federal Reserve definition of material risk takers includes employees (or groups) anywhere in the organization who, through decisions or influence, can expose the organization to material risk. These are the employees whose incentive plans and performance goals should be scrutinized to ensure they do not encourage imprudent risk taking. These employees should receive additional, regular communications on the risk expectations of the enterprise.

While the definition is helpful, a "back of the envelope" approach to identification of material risk takers is not sufficient. Rather, a rigorous analytical approach should focus the organization's intelligence on the full range of business risks and map employees from every function

to specific risk-taking scenarios. These employees are not always the most senior people in the organization, and their ability to materially impact results may not always be obvious. For example, consider traders and employees who build models that establish and monitor risk parameters for acceptable trades.

Allocating risk capital to employees in critical risk functions and comparing it to a defined materiality threshold (e.g., a specified percentage of profits) can be a useful quantitative approach to identify material risk takers.

Organizational culture is another important factor that shapes the risk environment. Companies that overvalue short-term return run a greater chance of encouraging "rogue" behavior, prompting employees to take inappropriate risks or encouraging managers to turn a blind eye to risk taking. Therefore, it is important for managers to think critically about the tone of the organization's cultural attitude towards risk. An ideal culture balances support for prudent risk taking (e.g., that which supports differentiated performance and innovation) with strategies to discourage excessive risk taking.

## 1. APPLY RISK BALANCING/DESIGN INTERVENTIONS TO MINIMIZE RISK

Incentive plans must similarly find a balance between performance focus and risk sensitivity while taking into account business requirements and market practice. Managing these tradeoffs is the crux of traditional plan design. However, in the effort to motivate growth in profitability and shareholder return, risk balancing mechanisms are not always applied. There are a number of design features that should be considered to balance risk and reward, including:

- Risk-adjusted performance metrics in addition to the traditional P&L metrics
- Effective use of discretion as a hedge against wind-

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falls or, conversely, achievement of stretch goals through inappropriate behavior

- Specific quantitative caps/windfall provisions
- Deferrals that match the time period between actions and outcomes
- Provisions to facilitate clawbacks and acknowledge performance tails
- Eligibility threshold criteria that limit participation to accountable individuals
- Pay level and design benchmarking to ensure that any rewards are competitive and do not provide outsized results
- Rigorous assessment of quality of goals and outcomes—that is, both how they were achieved and their durability, ensuring that critical investments are not compromised.

## 2. ESTABLISH AN INCENTIVE GOVERNANCE FRAMEWORK TO ENSURE BALANCE

Regardless of its risk profile, an incentive plan requires oversight to ensure it is designed and administered effectively. A thorough review should involve an interdisciplinary perspective from Finance, Legal, Risk Management and senior corporate management and should have Board-level visibility. There are four key elements of a robust incentive compensation governance framework:

- Structure: What organizing approach will best support the execution of the governance model?
- Roles: What stakeholders are involved in the core processes of incentive design and administration?
- Decision Authority: What can each role do or decide for each incentive design and administration practice?

Processes & Criteria: What core processes must the enterprise conduct, and which criteria should be used to assure quality?

For organizations just beginning to consider incentive governance, mapping current practices can give a clear path for identifying weaknesses. Large, complex organizations often find that they have inconsistent, unclear practices, causing the same decisions to be handled differently in different areas of the business. Other organizations find that stakeholders (including, often, the risk team) are not consistently, explicitly included in incentive-related processes. Finally, some organizations' governance efforts are complicated because they do not clearly establish (and hence do not recognize that they have achieved) the desired outcomes of these processes.

Regardless of the governance structure and practices, establishing specific criteria can lead organizations to a deeper understanding of the effectiveness of their incentive design and administration processes. For instance, many organizations find that goal setting is a difficult process to manage and standardize. Incorporating criteria such as "Were common probability of attainment and allocation methods used for formulaic financial goals?" to the review of the goal-setting process can provide an objective basis for judging its outcomes.

## 3. MONITOR REGULARLY

A thorough analysis can point out where compensation program design features potentially motivate excessive risk taking. The process should be repeatable and include the following elements:

- Cataloging of programs, including all short- and long-term plans and sales incentives, and the potential size of the awards and impacts on the organization
- ERM framework as context with reference to the risk profiles of each business segment and the employees identified as material risk takers
- Identification of factors that mitigate the risks inherent in the plans, allowing for assessment of residual risk.

Regulators increasingly request quantitative "proof" of the degree to which incentives are adjusted for risk taking. Simulation, back testing, and other robust statisti-

cal analyses can test correlations among performance, risk and compensation. Analyses should consider differences between top earners' risk profiles and those of other employees, qualitative analysis and assessment of specific risk outcomes, and scenario analysis testing pay sensitivity to risk outcomes.

#### 4. ADDRESSING THE ERM OPPORTUNITY

Incentive compensation plan design practices are evolving rapidly. HR, Finance and Risk practitioners are working to better understand inherent and residual business risks as well as inherent and residual (i.e., remaining risk after accounting for governance and business practices which may mitigate risk) risk of incentive plans and to use this information to modify plan design and governance frameworks. Risk takers must have a clear understanding of risk parameters, the importance of compliance and the consequences of non-compliance. In addition, employees should understand what to do if they are pressured to take imprudent risks. By translating the ERM framework into easily understood terms for employees, ERM professionals can provide enormous support to the HR function.

Finally, embracing this work will have the benefit of aligning with the development of insurance companies' Own Risk and Solvency Assessment (ORSA) frameworks. Methods to gauge risk may include both qualitative and quantitative analyses to help portray a clear view of relative risks. However, the ultimate effectiveness of the approaches suggested here depends on communication and implementation throughout the enterprise. The result is achievement of the twin goals of strategically aligned motivation and a balanced culture of risk mitigation. ■



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# Incentive Compensation And The Erm Person/ Actuary

Charles A. Bryan

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I have been in the unusual position of being from an actuarial background and chairing the compensation committee of a publicly held entity. Over the last four years our compensation committee has attempted to achieve several objectives in our compensation approach for the CEO and for the named executive officers that appear in the proxy:

1. Motivate and Compensate that level employee for good performance
2. Retain good people
3. Limit compensation to a reasonable amount
4. Satisfy the requirements of the proxy advisory agencies such as Institutional Shareholder Services (ISS), Glass-Lewis, and others
5. Receive a positive vote on Say-on Pay.
6. Exercise good risk management
7. Other less important objectives

Up until 2013 we had a system for both the short-term plan and the long-term plan based on four metrics: gross written premium, return on equity, combined ratio, and increase in diluted book value per share. These are companywide goals and seem to satisfy goals 1, 2, 3, and 6. However, in 2012 we failed the advisory say-on-pay vote mandated by the Dodd-Frank bill and so we were motivated to speed up the pace of change and more strongly emphasize objectives 4 and 5.

We implemented a new long-term plan whose metrics are Relative Total Shareholder Return, Absolute Operating Return on Equity, and Longevity (to promote retention). So we now have six metrics when considering both our long-term plan and our short-term plan.

The one metric that speaks directly to risk management is the combined ratio. If the combined ratio is controlled every year, then the major risk will not arise from underwriting but instead from investments. Indirectly, we anticipate that the three-year Total Shareholder

Return and the three-year Operating Return on Equity will speak to our success in risk management.

So what are the issues that we found we had to consider and how did we incorporate risk management principles into the compensation system? The first issue was whether or not we should use Total Shareholder Return (TSR). Although the proxy advisory agencies are quick to emphasize that they do not mandate any particular metrics, at least one of the agencies uses a numerical score that in part includes a TSR component. Then we come to a secondary question: do the market and the valuation of a stock properly reflect how risky the stock is? After studying this issue, we did not come to a firm conclusion. There are numerous examples of companies who did not seem risky at one point in time because they were able to deliver consistent earnings at roughly the guidance level that, in retrospect, turned out to be extraordinarily risky. On the other hand, the market does seem to penalize those companies that exhibit risk by variation in earnings, often due to net catastrophe risk or lines of business whose combined ratio fluctuates radically. Several large publicly held companies such as Allstate have deliberately reduced their exposure to catastrophe risk because of the perception, or the reality, that the stock price was held down due to this exposure to high risk. We concluded that the best approach was to include TSR as one of many metrics but retain the combined ratio as a metric that directly addresses risk. In addition, in setting the reward levels for the gross written premium, the reward is achievable at the highest level only if the loss ratio is below a specified level.

The second issue was what time frame for incentives should we use? The industry practice seems to use three-years for long-term plans. That seems to be a reasonable compromise between the difficulty of managing and incentivizing over a long time period and the need to use a long time period since risk often shows up only after the book of business becomes somewhat more mature. Certain types of risk such as catastrophes will only show up over a longer time period. Sometimes, a three-year time period is too short.



The third issue was determining if there was any way we could directly include the risk in the compensation system without encouraging behavior that we did not want to encourage or discouraging some level of risk taking. After all, this is insurance. The three sources of risk we thought more deeply about were: risk of inadequate loss reserving; risk of catastrophes and a catastrophic event; the risk of under pricing current business. We concluded these were adequately but imperfectly covered near term by the combined ratio metric and longer term by the operating return on equity metric. Specific coverage of the risks would have to be by committee work emphasizing activities in these three areas, such as determining the probable maximum loss, and assurance that the required activity had taken place.

For inadequate loss reserving, we have three different actuarial reviews of the loss reserves each year. We perform the reserve review using credentialed actuaries that are also employees. We then annually engage a consulting firm to perform an overall review. And our independent auditors perform a review for the Audit Committee.

For the catastrophic risk, we rely on frequent reviews of our reinsurance program and our net retentions. However, this is flawed because there can always be more time spent on this type of review and its accuracy depends upon the diligence of employees. However, we do have strong reinsurance expertise on our Board and that helps us to monitor this risk. Hurricane Sandy showed this was imperfect.

For inadequate pricing, we have had to rely on a strong culture of underwriting caution and an ability to move capital quickly from one line to another line. Moving capital also has an effect on the distribution system. We also use the combined ratio as one of our four metrics in the short-term plan and we set a maximum above which there is no incentive pay for that portion of the plan. This is imperfect because no one really knows what the price should be for many lines, so we supplement the combined ratio metric with a review of the loss ratios by line and sub line at periodic board meetings to take advantage of the insurance expertise on our Board.

Of course there are numerous other risks that are controlled more through an Internal Audit process or other auditing. We have used Internal Audit to review things like the timeliness of claims reporting in programs business. These items can be appropriate for compensation systems below the CEO and NEO level but they can rapidly proliferate until it is a major effort to keep all the targets straight. We also have investment guidelines that are intended to limit the risk from investment fluctuation.

We are hopeful that the described compensation system draws a balance between achieving business objectives and avoiding unreasonable risks. ■



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# Some ERM Perspectives on Incentive Compensation

By Al Weller

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The title of this Call for Essays is “Incentive Compensation – The Critical Blind Spot in ERM Today.” The central question is what should enterprise risk managers do to manage the critical blind spot “incentive compensation.” The management goal was clearly encapsulated by William Shakespeare in 1605. In Macbeth Act 5 Scene 1, Lady Macbeth speaks the famous line “Out, damn’d spot! out, I say!”

Successfully achieving this goal may involve any and all of the following perspectives and considerations.

1. **Identifying Incentive Compensation** – Incentive compensation is created anytime there is a new economic deal (e.g., sale or contract), or a change in economic circumstances. Incentive compensation is commonly described more narrowly as a change to an underlying employment agreement to “incent” the employee to a new level and/or type of performance by rewarding such performance with increased income. In practice, for the following reasons, incentives arise in a much broader variety of circumstances. Sound management and, in particular, sound enterprise risk management requires awareness and recognition of these possibilities as a whole.
2. **Employee Diversity** – If every employee had the same background, came from the same economic circumstances and was motivated by incentives in the same way, places of employment would be incredibly dull and uninteresting. Such uniformity might even be a significant risk in itself. Employee diversity means that an incentive program that works well with one group of employees might be totally inappropriate to a second group. To use a decades old example, free Yankee tickets to a group from the Bronx probably would not incent a group from Brooklyn.
3. **Economic Motivation** – General motivations for economic activity can be classified many ways. For simplicity, one set of general motivations is:
  - Love – economic activity is undertaken to provide something for free to a loved one;
  - Fear – economic activity is undertaken to provide something for free to a person threatening physical harm;

- Mutual benefit – economic activity is undertaken for mutual benefit as when economic goods are bartered.

4. **Any single set of economic incentives is unlikely to have the same impact on individuals in each group.**
5. **Time Horizons** – Incentives are often tied to yearly intervals in keeping with annual financial reporting. But what happens when employee goals span different time periods? For example, do actuarial examination raises (commonly classified as a form of incentive compensation) have any impact on performance or even pass rates for groups of actuarial students focused on professional recognition as qualified actuaries able to design and manage actuarial projects? Or in a pension plan tied to average earnings before retirement, is a one year incentive to reduce overtime likely to overcome a multiyear incentive of higher pensions attributable to increased overtime?
6. **Levels of Communication** – Communication always occurs on multiple levels often with not every participant’s attention focused on the same level. In today’s age, e-mail on a phone appears different from e-mail on a computer appears different from printed copy. Some folks focus on main message and fill in detail; others on details and build to main message. Position in a firm can affect focus. There may be levels of meaning. In such cases, problems can result on levels not contemplated by the originator of the communication. To give one not uncommon enough example, introduction of a new incentive compensation program can be viewed as a reduction in salary with little chance of attaining incentives—in other words as an incentive to look for employment elsewhere.
7. **Incentive Compensation in relation to Overall Earnings** –In a bygone era when card games occurred by candlelight, sometimes it was appropriate to ask whether the game was worth the candle? In many business negotiations a change of 10 percent to 15 percent is needed before an offer is considered. When incentive compensation programs spread across many salary levels, testing whether the game is worth the candle to all participants is important.

8. **Measurements Used in Determining Incentive Compensation** – According to Goodhart’s law, when a measure becomes a target, it ceases to be a good measure. Goodhart was a British bank regulator but his comments apply as well to incentive compensation. For example, incentive targets can become self-fulfilling prophecies, when coding of premiums for incentive credit is out of phase with coding for policy effective date.
9. **Balancing Management Objectives** – Short-term management objectives (e.g., increased sales) can conflict with long-term management objectives (e.g., strong customer relationships and market-place image). Management needs to design short-term incentives to also contribute to long-term goals.
10. **Legal and Environmental Constraints** – Law, regulation, and even accounting and tax requirements can impose constraints on incentive compensation programs. Less obvious are constraints imposed by the business environment. For example, a claims management firm that billed for services as a percentage of incurred losses could take a hit to income by incenting rapid claim settlement at below historical average claim severities.
11. **Assessing success** – An incentive compensation program succeeds when desired performance improves, the improved performance contributes more to success than administration of the program costs, and employees recognize that their compensation is related to the overall success. This is far different than claiming accurate measurement of the contribution of each employee in the firm. Incentive compensation is not laser surgery and generally not suited to such precise evaluation. If Joyce Kilmer had worked in a human relations department, he might have written:

Incentive programs are designed by fools like me,  
But only God can make a tree.

In summary, unique best incentive compensation programs do not generally exist, but effective ones do. Review of the above considerations enhances the chances of effective, practical design and implementa-

tion of incentive compensation programs. Lastly, the list also serves as a checklist affording an expedient test of incentive compensation program features.

Some readers will have noticed that, unless you count the year 1605, there are no formulas, equations, data or statistics in the preceding paragraphs—a six sigma moment in actuarial literature if you will. The basics of sound enterprise risk management do not always require mathematical analysis. To this end, we close with a quote from William Bradford on the role of risk management in the founding of Plymouth Plantation.

In regard to the question of risk in crossing the Atlantic and founding Plymouth Plantation Bradford wrote: *“It was answered, that all great and honorable actions are accompanied with great difficulties and must be enterprised and overcome with answerable courages. It was granted the dangers were great, but not desperate. The difficulties were many, but not invincible. For though there were many of them likely, yet they were not certain. It might be sundry of the things feared might never befall; others by provident care and the use of good means might in great measure be prevented; and all of them through the help of God, by fortitude and patience, might either be borne or overcome.”*

Thus, Plymouth Plantation claims to have succeeded in part because of enterprise risk management. The example might even apply to the current Call insofar as survival is a mighty powerful form of incentive compensation. The point of this example is that a key step in overcoming the incentive compensation blind spot is understanding people in the enterprise and doing basic risk management analysis similar to what the Pilgrims did shortly after Macbeth was written. Hopefully the above list and examples help. ■



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<http://www.soa.org/research/research-projects/risk-management/research-2012-emerging-risks-survey.aspx>

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<http://www.towerswatson.com/en/Insights/IC-Types/Survey-Research-Results/2013/03/2012-Global-ERM-Survey>

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