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Timing is everything and these are exciting times for chief risk officers. The subprime phenomena has led to such visibility that you can't open a newspaper these days without mention of a firm's ability or, all too frequently, its inability to manage its risk. And that's where we can step in. We're the risk people!

And as always, risk creates opportunity. Personal risk is high as boards and regulators probe the adequacy of risk measures and controls. Even CEOs have been fired. But the opportunity to contribute to a firm's value is greater than ever with all of the focus on identifying and quantifying risk, whether in appropriately valuing assets and liabilities for extreme scenarios, managing limits for a firm's risk profile to minimize the next problem, and bridging the various risk elements to create a truly enterprise view.

Fortunately, CROs have now typically made it to the "C" suite, which is critically important for access to information and the ability to ensure remedial actions are actually implemented. But the challenge now, in these times, is staying in the "C" suite and balancing personal risk management with the enterprise's risk management.

Personal experiences always influence our perspective and in my case I was fortunate to see just how an engaged CEO and board, with a real commitment to risk management, can build real value. Zurich Financial Services (ZFS) went through a "near death experience" in 2002 with financial guarantees emerging from the woodwork, reserve inadequacies, little data on risk accumulations on the underwriting and investment side, subsidiaries operating very independently, and on and on. Jim Schiro entered as CEO and immediately launched a large number of critical improvement actions, including raising capital, selling assets, implementing expense measures, and putting a focus on core businesses and systems. And one of these critical initiatives was a solid mandate to build a state-of-the-art risk management program and embed it in the organization. Thereafter, in every move we made, we always knew we had the full backing and support of our CEO. That's unquestionably the single most important key to success in implementing a risk management framework.

In June 2007, five years later, S&P returned ZFS to "double A" status, and in its press release particularly noted improvements in risk controls and management. Then in October 2007, it was announced that Jim Schiro would receive an award from St. Johns University as "Insurance Leader of the Year," which singularly noted that he was an "exceptional leader with a comprehensive view of risk taking and risk management." This showed me that

during all that time, when we had our meetings and he was looking at his Blackberry, he really was listening!

This article will address three themes:

1. Successfully embedding ERM in the firm
2. Developing models and setting parameters
3. Incorporating and supporting the latest ERM research

1. Embedding ERM in the Firm

Most critical to embedding ERM in the firm is the interest and involvement of the board of directors. Today that might not be an issue, but today's risk failure headlines won't always be at the top of the mind.

Risk tolerances, and how the firm monitors compliance with the agreed tolerances, are a good starting point as they are at the heart of the board's governance responsibilities and, as a practical matter, the discussions quickly become engaging. Basic questions should address what the board wants for maximum volatility, quarterly or annually, in an agreed period of time (e.g., one in ten years), in the following areas: net income (posting a loss, for example), ability to maintain dividends, solvency and rating agency capital at levels not impacting operations or strategic initiatives, and franchise value (performance vs. peers).

These are followed by more intriguing questions, such as how to balance a maximum loss on a hurricane vs. an operational risk loss. Or consider foreign exchange trading vs. non-investment grade bonds. All affect the balance sheet the same way but the perceptions from the investors may well be vastly different. Thinking through the ***New York Times*** test, with the goal of avoiding the "whatever were they thinking" questions, also makes for good engagement with the board.

The board sets the tolerances at the highest level. The risk framework then extends this tolerance to units at the operating level, with the intent of providing transparency and an internally consistent framework. Generally this leads to a risk policy with internal limits on almost everything, at unit and divisional levels, and that allows such limits to be actionable and monitored at the lowest levels. It's the risk modeling and the risk management function that ensures and reports that the actionable limits, when aggregated across the firm, reasonably meet the risk expectations implicit in the board's high-level tolerances. It's also important for the board to review and agree on the internal operating risk limits, again, to engage the limits, but also to provide an element of clout within the firm to ensure adherence.

Another measure to engage the board is what we call total risk profiling. This is a structured exercise with a senior management group that develops and evaluates scenarios for risk implications and reviews remedial plans and the status of agreed-upon follow-up actions. Including the board and senior management provides for the broadest views on stress scenarios and is a solid way to get real involvement and ownership. This is key to considering bold scenarios, as the CFO of Goldman Sachs recently remarked, "The lesson you always learn is that your definition of extreme is not extreme enough." You need the leadership and involvement from the top to try to identify Donald Rumsfeld's "unknown unknowns"…the risks "we don't know we don't know."

Discussions of emerging risks are an important element. We must consider not just which ones might in fact emerge (e.g., nanotechnology, climate change, pandemics, cell mutations) but also why they might be relevant to our firm. We must also consider major changes in foreign exchange or the credit markets—how

continued on page 6 ◗

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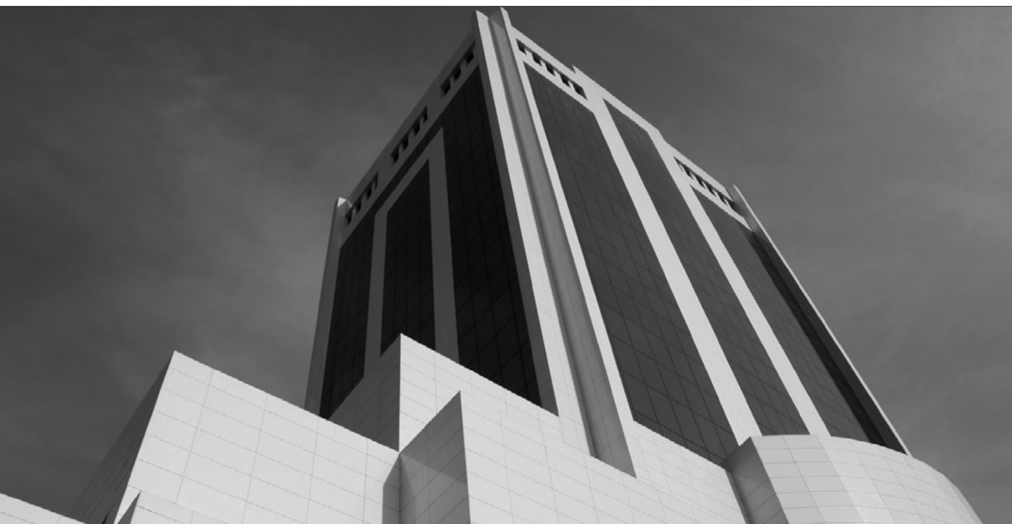
ERM Perspectives

◗ continued from page 5

might they be relevant? The CRO needs to do the homework, of course, on the stress scenarios and relevant exposure numbers, but such an exercise is a good way to embed risk management in the organization. If the "top dogs" at the board level do it, you can quite effectively get the businesses to emulate the exercise at their levels and to stiffen up the scenarios they consider. Then you can really harness the creative power of the organization.

With the board involved and demanding information, the mandate is there to establish risk committees at all levels in the organization. Designated CROs, too, even if not full time, should organize the risk activities, including the risk profiling, reviewing risk exposures vs. risk policy limits, measuring progress on remedial actions, and providing relevant information upwards. The breadth provides an important comfort to management and the board, but it's also valuable in embedding the risk culture in the organization. The enterprise view necessarily requires bridging the silos in an organization. My experience is that it is best if the CRO allows each functional area to carry out its own risk management. While risk management coordinates these risk management activities, ensuring rigor and that the limits fit the overall risk profile, I advise leaving responsibility for the day-to-day risk oversight in the specific risk area. Why? It is important to assign ownership within the area and then risk management can be the "auditor" and keep its primary focus on correlations, aggregations, modeling, and scenarios at the enterprise level, which are at the heart of an ERM program and where the real value is added.



Operational risk (including business continuity management) is another way to increase awareness and involve local management. Subtleties such as allocation to line and geographical unit help to strengthen the reliability of data collection, for example, and ensure other follow-through actions are implemented. More important than the rigor, though, is the idea that you are doing allocations and that makes it important, and so actions follow. If there are no consequences, then it becomes a "nice to-do." Operational risk losses can have greater consequences than, say, a hurricane loss—one is our business and the other is a sign of weak controls and management. This sends a tough signal to the markets.

Collectively, actions like these engage the board and drive ERM into the organization. Nirvana is when the audit committee (or finance committee) gets so engaged with risk issues that the board decides to create a risk committee… which ZFS did in 2006.

2. Develop Models

Collecting relevant data is critical. A mantra of Zurich's Jim Schiro is: "What gets measured gets done" (and paid attention to). This requires addressing system incompatibilities, standardizing definitions, and the like, so that measures of risk exposure can be aggregated on a consistent and meaningful basis.

The models, of course, are what provide the overall framework to aggregate the firm's risk tolerance to specific risk limits by segment (e.g., credit risk, investment risk, ALM risk,

underwriting risk, F/X) while incorporating assumptions on correlations and distributions. The models are unquestionably important but almost more important than the models and their "results" is the discipline in setting the myriad internal risk limits, monitoring compliance, and aggregating relevant accumulations across the organization. That's where real risk management value gets added.

Assessing aggregate credit exposure is a good example of the complexity and need for data capture across the firm: Reinsurance assets, exposure in the UPR, bonds, equities, security lending, performance guarantees, and surety bonds, E&O and D&O all have the potential to aggregate into a loss in a stress situation for a firm. Examples in the insurance arena include group life, workers compensation, property on the building, D&O, E&O, equities, bonds, guarantees of various types, etc. All present complicated data capture issues, especially in an international organization, not to mention referring and acting on incidents of excess accumulation. Later, I'll address some research that Enterprise Risk Management Institute International (ERMII) members are conducting in this area.

Collective input on correlations is important, particularly correlations for stress scenarios. Valuing underwriting exposures and assets and liabilities in stress situations are important, too. Richard Bookstaber the author of A Demon of our Own Design, observed, "We must move from the technicalities to judgment." The "KISS" principle (Keep it Simple, Stupid) is alive and well. In identifying the key parameters, especially correlations, we need to get outside and inside views and create a transparent process for the final selections and related probabilities, both for buy-in from senior management and the board and for the explanations when and if an incident arises. We must balance the sophisticated with the practical if one is to avoid what Ben Bernanke describes as the all too frequent "misunderstanding of financing models among senior management, or a failure to recognize and cover limitations of the models."

A typical scenario that would provide valuable discussion with the management group would be how interconnected global markets should make the world economy more stable, with risk spread more widely. But, Richard Bookstaber writes that "It's not happening." What's different now is how closely international markets are correlated with one another. Bookstaber continues, "Everyone tends to invest in the same assets and employ the same strategies…As markets become more linked, diversification doesn't work as well."

Bookstaber further points out that "global markets may actually be more risky than in the past, as the same types of investors are taking on the same type of risky bets and then simultaneously heading for the exits when trouble comes," making the hedging fail or become unavailable. Stress scenarios we need to consider for their impact on a particular enterprise need to contemplate such unfolding economic relationships.

The models are also necessary for capital allocation (but again much of the value isn't in the allocation, but in the understanding that capital is being allocated and if one effectively and transparently manages risk it leads to less capital—an important outcome).

This is much more important than the nuances on the allocation. It's the same for the operational risk allocation. Too often, we don't allocate such expenses because we can't provide sufficient "accuracy" but it's the idea that it is being allocated that lines up the "hearts and minds." Another aspect of the models and relevant data is to question values under extreme stress scenarios. The subprime meltdown is, of course, a recent glaring example. But as a general rule,

continued on page 8 ◗

ERM Perspectives

◗ continued from page 7

and going back to Shiro's "What gets measured gets done," perhaps it should be expanded to "Don't do what you won't be able to measure." You don't want to go to your management with a quote like Ben Bernanke's on collateralized debt obligations, when he said: "I'd like to know what these damn things are worth." And in this vein, we have preliminary plans in place for ERMII to develop a joint workshop in the spring with Columbia on valuing illiquid assets. In addition, the research track at the ERM Symposium will include work on certain aspects of quantifying credit risk.

3. Incorporate and Support Latest Research

Why is research important? It's partly defensive—if adverse circumstances develop, you want to be able to demonstrate an appreciation and work toward "state of the art." And there is some good research work going on now. The task is to determine which best practices could meaningfully and reasonably be incorporated in the risk models, impacting stress scenarios, correlation parameters, and so forth.

ERMII members are one good source for such research. The CAS and SOA are sponsors of ERMII, as is the Institute of Actuaries in Australia. ERMII has a clear research focus. Academic institutions are the members, and include Columbia University, University of Lyon, Carnegie Mellon, University of New South Wales, Georgia State, Wuhan University in China, and others.

ERMII has held a research workshop in Lyon, France on evaluating diversification at the group level, which was typical of a number of such research activities. The presentations included one by Shaun Wang of Georgia State on "Correlation Modeling and Correlation Parameters for Economic Capital Calculations," which examines various drivers of correlation, along with their diversification benefits or contagion effects. Wang's project also included some tail correlation models, including correlation between risk factors, business lines, and geographic regions. Alexander McNeil, from Heriot-Watt University in Scotland, explained how mixture models for random vectors may be useful in risk modeling. Steve Kou, of Columbia University, tackled the question of what is a good risk measure. Gary Venter had an excellent presentation on pricing the "option" a subsidiary has on the firm's capital. All of the presentations were interesting, with practical insights. The presentations are on the ERMII Web site. Please visit the site to see which ones might be relevant to your organization.

Broadly, the subjects are extremely relevant now. The real internal value is in discussing the relevance to a firm's risks and the discussion of parameters, stress scenarios, etc.—getting the risks identified and getting senior management involved in determining them. Also, participation in such research work on correlation factors might well provide some "safe harbors" for the modeling and firm if and when a stress incident occurs. And since the Lyon workshop we've held a workshop with Columbia University on valuing illiquid assets, a timely subject for sure. We've also worked with the PRMIA Institute on the research track for the ERM Symposium in April.

Plans are under way for a research conference November 12 on commodity risk, which we will co-sponsor with S&P. The venue will be New York. Details will follow.

If anyone is interested in participating with one or more of the ERMII research groups on topics such as the treatment of risks with different time horizons in a market-consistent way, or the interplays between liquidity, market value and long-term value, and how one might value a series of deposits (as in a life policy), please contact me. This would be another way to ensure that you are incorporating state-of-the-art research and techniques. My final thought is that the ERM techniques described here readily apply to non-financial services industries. Longer term, using our quantitative risk skills to expand into these other industries presents strong growth opportunities for actuaries. ✦

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