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Integrated Risk Management

Moderator: Alastair G. Longley-Cook

Panelists: Nancy E. Bennett
Valentina A. Isakina
Alastair G. Longley-Cook

Summary: A new holistic approach to risk management is evolving. Through this session, one can gain an understanding of integrating the risk management function within an enterprise. Topics include quantification of risk exposures, including insurable and financial risk, considerations in addressing nonfinancial risk, modeling risk on a company-wide basis and ensuring consistency in assumptions and methodologies of cross applications.

MR. ALASTAIR G. LONGLEY-COOK: Some people refer to integrated risk management as enterprise risk management (ERM). Whatever term you use, the concept involves evaluating, monitoring, controlling, and mitigating risks across the entire insurance company so that you both understand and control the risk. You should also seek synergy and look at those risks in total—not just from a single viewpoint.

I've been with Aetna 28 years, and for the past year-and-a-half, I've been with Tillinghast. I specialize in enterprise risk management, both in terms of consulting and working with the Academy and the NAIC on the risk-based capital standards for life products. The task force for the Academy that makes recommendations to the NAIC is working on standards for the new variable products for guarantees. That is one way of monitoring and measuring risk. I'll talk about quantification in risk exposures, including insurable and financial risk considerations in addressing nonfinancial risks.

Nancy Bennett is a consulting actuary with Milliman USA in their Chicago office, and her consulting practice focuses on financial management, including corporate modeling, embedded value appraisals and risk management. Prior to entering the consulting world, she also had a real job. She was corporate actuary for Minnesota Mutual.

Third on the program is Valentina Isakina, ASA, MAAA. She is with the Society of Actuaries as the finance practice area actuary, and she oversees the Risk Management Task Force of the Society of Actuaries. She'll be giving us an update on what they're doing and where they're going. With that, let me turn it over to Nancy.

MS. NANCY E. BENNETT: This whole area of enterprise risk management or integrated risk management has certainly been gaining a lot of attention lately. It seems to me that risk management is not that new. As actuaries, we've been managing risk for a while now, but it certainly seems that this ERM notion is almost cropping up as if it's a whole new discipline and something that we've never done before. There are a lot of different economic and situational factors within the last few years that have kind of changed the emphasis of policyholder and shareholder interest, and there is a different understanding of how companies take on risks.

I'm going to provide just a little more insight into why I think risk management has changed in scope within this broader financial services industry. Then, I'll focus on how a company might go about setting up a risk management process, some steps to consider, and what companies are really looking to accomplish. I'll close with some comments on some of the different tools and measures that will form the technical infrastructure for a risk-management process.

I've been working and speaking in this area of risk management for a while. For a long time, it was called financial management, but I guess now we're calling it risk management. Much of my work over the last couple of decades has probably been done from a relatively narrower focus, that being the financial risks that are faced by more of the typical U.S. life insurance companies. Today, whether by choice or just because the nature of the industry has changed so much, the typical life insurance company is now operating in this broader financial services industry. As such, companies are faced with a lot of different kinds of risk. This creates a need

for a whole different approach to risk management. I think the different constituencies that evaluate the financial services industry are the rating agency, the analyst, the board of directors, and everybody that gets in the act. They are expecting or demanding that insurance companies really provide them with different information in terms of their risk exposures and what they're doing to manage and control their risks.

Within the financial services industry if we take a broader step back and look beyond just life insurance and the United States, I think we'd see that there are a number of factors that can really explain why risk management appears to be a whole new discipline. I think one of the primary reasons for that is really the state of the economy that we've been operating within for the last few years. We're dealing with probably the third year of some of the lowest stock market returns in a long time. We're also dealing with very low interest rates and credit losses that we haven't seen in a decade. All the general economic conditions have kind of hit companies in a way that they didn't really anticipate. These conditions are becoming a stark reminder for them that some of these risks that at one time were considered tail risks and very unlikely to materialize, are suddenly on the bottom line almost on a daily basis. Some of those marketing freebies that we gave away when we were trying to sell variable annuities and compete against the banks were called guarantees. We're finding that those guarantees that we tacked on aren't free after all. I think these financial and economic realities have really made companies take a whole different view of risk management.

In response to some of these economic conditions and just the company view overall, we're seeing a lot of reorganizations, both demutualizations, mergers and just the company's general interest in taking a look at their businesses and focusing on their core competencies. Of course, the industry is globalizing its ever-increasing market share from the multinationals. This is true of both companies that are owned by non-U.S. parents and U.S. parents expanding into the foreign markets. This has created a change to the consumer base, both in terms of the product, the type of consumer, and the method of distribution. Once you start changing all those things, you are going to have some increased litigation from policyholders, probably due to some misleading sales practices or maybe some agent misrepresentation. Of course, once these things start happening, the regulators aren't going to be far behind. They're more interested than ever in

making sure that they understand company risk or at least understand and feel comfortable that the companies understand their risk a little bit better. They're demanding greater disclosure in the financial statements, partly due to a decreased confidence in what the financial statements really say about a company.

Overall, I think one of the things that's happening with risk management or ERM is companies are finally starting to acknowledge that they really do need to do something different. I think a lot of companies have been humbled in the last few years. They maybe didn't have a handle on all of their risks, and they really do need to do a better job with integrated risk management.

Last year Milliman took a survey on risk management practices in the insurance industry. Here are some interesting conclusions that came out of them. I don't know if it was entirely surprising, but it really enforced some of the things that we were suspecting all along. Probably one of the most important things is that company management told us that it believes that enterprise risk management has value, and that it is something that a company should do. Management believes that it does have value beyond just the regulatory demonstrations. There's actually value to it. They also recognize that ERM encompasses more than just financial risk. It's more than just financial and nonfinancial risk. Companies told us that they were comfortable with their processes for managing the financial risks. They felt that their AOM and interest rate risk and credit risk assessment processes weren't sufficient. Where they felt they needed the most help was in understanding the nonfinancial risks and how to bring it all up at an enterprise-wide level. Overall, they thought that the tools and processes to support this were inadequate. They really didn't have a lot of confidence in the measurement techniques that the technicians or the professionals were bringing to bear on this topic, and they weren't entirely convinced that the staff or the professionals had adequate training to really understand the internal risks. I think the last thing is that there was really no consensus on one measure of enterprise risk.

As you're probably aware, the banks have largely adopted the value-at-risk measure as one single measure of enterprise-wide risk. For a while, it seemed like the insurance industry was going to embrace value at risk (VAR) as a measure. I think some different companies and different rating agencies looked at the different idea. In my opinion, the industry seems to be moving away from

VAR as kind of the measure of enterprise risk. I think it will still probably be calculated by some companies, but I hardly think that there's any consensus that that is the one measure that we need to use.

We found out that companies were looking for a number of things out of their risk management program. They view the risk management process as a way to help them efficiently allocate capital, whether that be to existing ventures or as they pursue different ventures. The insurance companies are starting to get more and more involved with activities that are not within their traditional scope. Think about funding agreements and that general area. That's not really an insurance product, but there are a lot of companies or several companies that are starting to get into that and companies recognize that, with these different ventures, comes a different need or a different way to look at how the capital is allocated to those new ventures. It really doesn't come as a surprise to all of us, although we understand the importance that investors place on stable earnings. The last couple of years, as the stock market as been going wild, earnings have been more and more volatile, so companies have been really struggling with getting a handle on earnings volatility. We try to come up with some way to manage that volatility and perhaps even stabilize it and mitigate some of the risks. The hope is that a risk management program will help with managing the earnings volatility. It also helps to manage the cost of transferring some of the risks because if you want to mitigate this risk, it might cost you. You'll probably have to either securitize something, reinsure something, or investigate many of these different risk transfer vehicles, all of which have a cost.

Companies believe that if they adopt a more formal and rigorous risk management process, that will help to raise the overall competence of risk within the company. I think that one of the things that companies are beginning to realize is that there are a lot of people and a lot of decision makers within an organization that can expose the companies to risk. Some of it is intentional, some of it's unintentional, but I think companies are recognizing that they really need to start getting some of the decision makers to the point where they think about risk as part of the business plan and as part of their decision to embark on a new venture. They are looking to a risk management program that is not only used to mitigate a risk, but it also is used to transfer it and to get rid of something. Admittedly, this is more of a defensive play. They are looking at

risk management as a way to help optimize the company's values, which I guess is another way to say it's kind of a defensive play.

With that in mind, I wanted to just give you some thoughts on what I consider to be what you can do if you want to help your company establish a more formal enterprise risk management process. I'm not going to get into all of these things, and you can probably read some of these as I'm speaking. You have four basic steps that are involved in establishing a risk management process. The most important aspect of getting off on the right foot with an ERM process is that you articulate your company's philosophy for risk. You must gain an understanding and communicate what your company's policy is as it relates to risk. Do you consider yourself to be a conservative company? How are you going to tolerate briefings in risk management, and exactly how do you want to communicate your philosophy about managing risk within the organization.

The second major step in establishing a risk management process is to establish an accountability for the overall risk management function. There is one thing that has plagued risk management in the last few years. Executives and senior officers, and even the CEO, wonder why you're talking to them because they manage risk all the time. Our investment people keep track of our fallen angels. We have a good credit risk management program and this corporate actuary unit that looks at interest rate risk. The business units keep track of lapse and persistency, and in the minds of these executives, there are all kinds of people accountable for risk. While that's true, I would say that that accountability is defined more in terms of the individual or the specific function. There isn't actually one person that is accountable for looking at how risk affects the overall enterprise. What this means is that you're going to have to determine if the risk management function should be centralized. Many companies are going to the appointment of one chief risk officer. Other companies are not selecting one individual, but trying to accomplish this through a committee type structure that deals with all the different risks. Overall, it's important that you establish accountability for the area, so that if you really want to get into risk,

you understand who is accountable. Somebody must be responsible. I use the word somebody broadly for communicating what the different risk exposures are, and what processes the company is using to monitor those risks. Finally, how are some risk-adjusted performance measures being calculated and evaluated in the overall process?

A third major step in establishing a risk management process is you obviously create an infrastructure. You can't just talk about risk. If you really want to manage risk, you have to be able to measure it, and at least monitor some key statistics over time. You must have a sufficiently quantifiable or technical infrastructure that includes some modeling capabilities. As much as anything, you need to make sure that you have some people that are skilled in the area of risk management. It can be actuaries, but I think you also have people that understand the concept of risk in a much broader enterprise concept. You can't just be talking about asset/liability management (ALM) risk; you also have to be talking about what agents can do to you. Those are probably the kind of things that will take your company down. It's probably not an interest rate mismatch that's going to create the most problems for your company. If people really want to become experts in risk (and I say this to an audience that includes a lot of actuaries), I think we have to expand our skill set and understand not just the financial risks with which we're probably the most comfortable, but also understand the other nonfinancial or operational risks.

In order to have a very effective risk management process, you have to have some type of communication and feedback loop where you not only accept your exposures, but you also monitor the effectiveness of the programs. You can't just be putting out reports and information. You have to take a step back and say did we or could we have seen Enron coming? Could we have had some better processes on our agents so we wouldn't have been socked with some of these lapses? It's important to have that process set up.

I mentioned before that in trying to figure out or establish a process, you have to decide if you're going to have a centralized or a more decentralized process. A company might or might not designate a formal chief risk officer or establish a risk committee. In order to be practical, you

really need to assign one person with a primary responsibility for at least coordinating and facilitating the whole risk management process. I think you need to make sure that you establish some expectations for this one individual that might be responsible for a particular area. They should be primarily responsible for developing this report on risk exposure, facilitating the communication, and basically understanding what exposures to risk the company has and how that relates to what's going on in the external environment. Think for a minute about the general management situation. Once general management's liquidity problems were known, every insurance company became more vulnerable to liquidity risk. It's important that you understand your company's exposures that arrive from your own practices, but also recognize that the perception of risk can be almost as important as that.

In order for the risk management process to really be effective—to facilitate this process and to truly help the company manage risk—it's really important that the company actually demand something out of their risk management area. Let's go back. In particular, demonstrate that the risk management function has actually created value. You don't want to have the risk manager just be somebody that produces a lot of interesting information. I think the most effective risk management program will have a risk management area that actually has an accountability. You hold that person or area accountable for accomplishing some things.

As I mentioned, another fundamental step in establishing a risk management process is to build the infrastructure. It's important that you have a quantitative basis for evaluating risk. It's another reason to at least have an objective basis on which to launch some of these discussions. Regarding allocating the capital, I always found that the most difficult discussions are with those people who have the absolute best idea about giving them capital for their operation. Unfortunately, they didn't have a business plan, they never had it quantified, so all you're doing is just having an emotional discussion with these people about why they should get capital. I guess some of that is important, but it's always nice to start out with at least a quantitative basis for what they think they're going to get out of this program. I think that's what the risk management framework is supposed to provide. I'm not going to get into this a lot, because

Alastair is going to cover this in more detail. We all know that companies today have a lot of models that we're used to using, and we use them for a lot of different purposes, such as cash-flow testing, planning, asset/liability management, pricing and different things. I think the one thing to remember is that as you build or enhance your existing model, risk management models really require a few different characteristics.

One of the big issues with risk management models is that you need to come up with a way to correlate all the different risks within your organization. You need to build in some assumptions to your models that you probably don't reflect in some of your other models. In a risk management framework, you might be asked to look at analysis that has a different time framework than ALM or certainly strategic planning.

I think what you're going to find is that the basis of your infrastructure for establishing a risk management process can leverage off of the models that you already have built. You will probably need to expand those models and make sure that you can adapt with some different type of analysis than you have before.

I suspect that many of you in the audience are generally interested in helping your company establish a better enterprise risk management process. You probably also read an article or two about risk management. I think there's an overwhelming amount of information out there about risk management. I thought I'd leave you with a few practical considerations on helping your company establish a process. In order to get going with a risk management process, it's important to establish a structure that fits your company's culture. Some companies are very heavily focused on quantitative aspects, and some companies use judgment in making their decisions. Whatever that culture is, I think it's important that your initial risk management process be consistent or compatible with that structure. I think that while it's important to model and measure as many of these risks as we can, we're probably not quite sure what enterprise risk management looks like. I would say it's probably most important to simply just get started with something, put something in place, and then move forward with it. It will get better with time.

As I said, it's easy to get lost with some of the real technical discussions like stochastic processes and perimeters and all these different things. Overall what you're going to find is that, in addition to having a reasonably strong analytical foundation, there are a handful of factors that will influence the degree to which your risk management program is successful. I've weighed out some of these things for you here, and I talked about them, but we have to get some executive involvement as well as talking about what you expect from the process. I think that a company can benefit significantly from taking a different view or a higher level view of its risk. I think it's important that a company take a more comprehensive view of the enterprise and augment some of the intuition with a few more robust and quantitative processes.

Finally, I just want to end my presentation with a motivational theme. I think that not only companies can benefit from an integrated risk management program, but actuaries can also benefit. We have to kind of step up to the plate and help the companies that we work with. We have to work to develop a better or more integrated process, I think we're in a unique position because we have a lot of skills that a lot of other professions don't have. By stepping up and expanding our skill sets, we will not only increase our marketability within the overall industry, but I think we will also be offered more opportunities for career advancement within the company that we're in. With that, I'll turn it over to Alastair.

MR. LONGLEY-COOK: Thank you Nancy for setting the stage and talking about both the need for enterprise risk management (ERM) as well as the opportunities and benefits that can be derived from it.

We live in a time where enterprise risk management has come into its own. Nancy mentioned a survey that Milliman and Robertson did. Tillinghast just completed its survey on enterprise risk management as well, which is an update of one it did three years ago. The change between then and now is remarkable. I don't have the data points in the slides because we're just completing the survey now. The deadline for these slides was a month ago, but that will be coming out November 1. If you want a copy, just e-mail me. I'll give you a couple of data points that I thought were very interesting. One is that approximately half of all insurance companies

responded to the survey. This is life, health, and property/casualty companies worldwide. Roughly half have an enterprise risk management process in place, and another 38% are considering putting one in sometime in the near future. Those two numbers added together make it 49 and 38. You're talking about a vast majority of the insurance industry either having the ERM in place or having one in soon.

The second data point that was interesting was that of the chief risk officer (CRO) that Nancy was recommending. When we did this three years ago, 20% had a CRO. That percentage is up to approximately 40% today, and another healthy percentage are considering appointing a CRO in the near future. You can see the momentum building here. Unfortunately, some of that is due to some of the corporate malfeasance. On the other hand, I think there are risks associated with products today that we didn't have five or ten years ago. I mentioned the new RBC standards for variable products with guarantees. Clearly, there are risks that are much more complex that need more complex solutions in order to manage them.

What I'm going to talk about are the aspects of enterprise risk management that are near and dear to actuaries' hearts. One aspect is how do you do the quantification? How do you get your arms around your exposure? There's much more to ERM than this. Nancy gave us a good overview of that. I want to emphasize that this is just part of ERM. Since this is a valuation actuary symposium, this is good stuff for us to get into, because this is stuff we're comfortable with. In terms of who does what in an ERM process, this is probably where actuaries bring the most to the table. I'm going to talk about metrics, and I'm also going to talk about nonfinancial risks.

The types of risk models that are being used today vary quite a bit, so you need to think about what approach to take. You can do a historic review and say what has the stock market done in the past 20 years. We'll just run some cash-flow models through that and see what happens. Another approach that is used by the banks a lot is something Nancy mentioned. There is value-at-risk, and if you're familiar with risk metrics and some of that work and some of the work that is behind a lot of the banking regulations, you'll run into VAR a lot. You're basically talking

about mean variance and co-variance (MVC) models where you get sensitivity and maybe a second derivative sensitivity as well. You calculate a couple of standard deviations. I'll get into the pros and cons of these models. As Nancy says, there are some problems with using that in the insurance environment.

The type of modeling that's becoming more popular now is the use of actual models, particularly stochastic scenario models, which are now used in a lot of asset/liability modeling and in the new RBC C-3 phase two project that I mentioned that my Academy committee is working on. There are two general approaches I'll discuss in more detail. One is having separate distribution models that are linked. It's kind of like the mean variance and co-variance approach. The second approach would be an integrated model.

Let's go through the pros and cons. Needless to say, the scenario approach clicks on all five cylinders. I'd say some of the key problems with historical and MVC is the reliance on history and the static correlations. You might be familiar with what happened to Long Term Capital Management. You might have read the book that was written about the situation called *When Genius Fails*. There's one line in that book where it says all these models were great, except they had all these correlations. When the foreign financial structure began to crumble around the Russian bond defaults, all the correlations went to one. I think that's a good way of putting it. Correlations are fine in normal situations. When you get out in the tails, they start moving and they go in whatever direction is worse for your risk exposure.

I think we're all familiar with how to pull this together as it worked in asset adequacy analysis. We've done something similar to this. Generally, you pull together your scenario generator, data, constraints and strategies, which are put into some sort of cash-flow model aggregator like TAS, PTS or your own home grown aggregator. Out of that you get your projected financials for each scenario, distribution, and risk metric.

There are a few types of economic scenario generators. There might be separate distributions. You might have a lognormal distribution on a spreadsheet for your equity returns. Maybe you're using the C-3-1 interest rate model that's on the Internet for your interest rate. Maybe you have your own model or maybe you're using one that's built into TAS or PTS, for instance. You link them with a co-variance metric. The advantages are that it's Excel friendly. Generally, a student can throw this together. It's fairly easy to design internally. The disadvantage is that, if you really do it right, and you have 10 or 12 risk drivers and with the co-variance metrics, you're going to need to link that. You end up with millions of data points, and you don't know what to put in them, because the correlation data are fairly sparse. You can get good correlation data from risk metrics and other sources for foreign exchange or correlations between different points on the yield curve. When you try to relate equities to interest rates to mortality to disability or to whatever, you're on your own. That's difficult.

As I said before, the matrix is static, and that can get you into trouble if you're looking out for the tail. I would say it's commonly used, but it's dangerous. It is not the best practice, but that's what's commonly out there. If that's what you're using, think about moving to another approach, which would be an integrated model. Tillinghast happens to have one called Global CAP:Link. It's indicative of this approach. There are other ones out there, and there are some companies that have developed their own, even though it is fairly labor intensive to do that.

The way these work is you start with the short and long interest rate Treasury yield curve, and you cascade all the other parameters off that, so you get price inflation, which would give you the equity returns; you have the bond returns with assumptions around spreads coming off that. There are all kinds of other ones as well, and they're all linked. Let's say you run 10,000 scenarios. The advantage is each scenario will have vectors of parameters at each duration, so you don't have to run stochastic on stochastic. It links the dynamics so that when you get out in the tails, the correlation is different from what it might be in the center. The disadvantage is this is not something you just turn over to your students to create in the next two months.

Once you have the models, you need the metrics, and that's not as simple as it sounds. What we are probably most comfortable with as actuaries is the probability of ruin thresholds. We studied ruin theory. We're familiar perhaps with RBC standards that have historically been based on this. What that basically says is, run your scenarios and find out at what level you fail. Let's set that at some level like 95% and hold the capital you need to ensure that you don't fail, or you can just break even at that point.

A new measure that is being introduced that is more effective in dealing with extreme tail risks is conditional tail expectation (CTE). This was introduced by the Canadian regulators in their segmented fund capital requirements, and we are proposing it for the C-3 phase two requirement for variable annuities and guarantees. For 90 CTE, you look at your 10% worse scenarios and take the average of those. The reason is that, as we look at some of these asset and liability combinations, you might find that you are fine at 95%, but at 97% you may crash and burn. You need to go further out in the tail and capture some of those risks. You're getting not only a probability threshold, but also a look at the severity of the failure.

The cumulative probability on the present value of surplus is ranked from low to high (see Chart 1). Let's say we set our probability threshold at 90%, so we look at 10% on the vertical axis. The corresponding point on the horizontal axis gives you the present value of surplus using a probability threshold. The *average* in the tail would give us the 90 CTE.

All of those measures are from the policyholder's prospective. You're concerned about ruin and insolvency. The other side of the coin and the one that is probably of more interest to your CFO and your CEO is the view from the shareholder's prospective. They're going to want to know what's going to happen to the GAAP earnings next quarter. What is the probability that it will fall below a certain target? Here are some measures that you should consider from that standpoint. The standard deviation of earnings, which is usually GAAP earnings, is what Wall Street looks at in their risk. So we might do the same. It gives the same weight for bad versus good. You might want to just look at downsized standard deviation and below target returns.

The best practice would be to look at both—some kind of policyholder risk measure and some shareholder risk measure. You'll need both if you're going to talk to your CEO, your board, Wall Street analysts, the rating agencies, and the regulators. Also look at the underlying economics.

We would say that best practice would be to focus on two measures. One would be economic value at risk (EVAR), which is an extension of value at risk to an enterprise that has long tail assets and liabilities. You're looking at the loss in economic value, the present value of future earnings over a given time period, which is longer than VAR. VAR is usually three days. We're more concerned with a quarter or a year at a given probability level. So you can talk in terms consistent with VAR, but apply it more to the assets and liabilities that we're interested in.

The other measure that the CFO or CEO is going to want to look at it is what is the down side on my earnings? What's the earnings at risk? What's the deviation from plan in a given reporting period, like say three to five years at a given probability level? So, in economic value at risk, you'd look at your expected, your target probability, and the loss and present value of earnings at that probability level.

I want to talk about nonfinancial risks, because this is where the least comfort lies. Nancy mentioned in her survey, and we found the same in our survey, that chief financial officers and companies are least comfortable getting their arms around nonfinancial risks. Again, Nancy said it quite correctly. That's where the problems usually are. That's where the rogue traders are, and that's where the fraud is. That's where the accounting creativity is that has brought down some of the largest companies in the world. How do we do that?

Let's take a look at operational risks, and just another reference to what's going on in the world. Basel Accord II, as applied to banks, gives a capital standard to banks for operational risk. There is a set formula. To get a break from that, you need to convince the regulators that you have better experience than that, and you're monitoring and controlling it. The banks are doing this

now; the question is, can we do it? Operational risks are different. They're indigenous, and they're very related to and driven by internal operations, not external capital markets. You can get company-specific data, and it must be representative of the current operational environment.

Before the Barrings problem, experience data wouldn't have captured what that trader did, so there's a problem there. Operational risks are managed by changes in the process, technology, people, and organizational culture. This is generally outside our comfort area, but this is where you need to go to manage these risks.

I'm going to talk a little bit about one called system dynamic simulation, which is a best practice in this area. You start off with your expert input, and you develop a system to map cause and effect relationships. You quantify each cause and effect relationship using a combination of data and expert opinion. You might have that kind of mapping from the change in the cause variable to the change in the effect variable. You explicitly reflect the uncertainty around those estimates in the modeling and in the mapping. Then, using computers, you simulate the range of outcomes to get the same kind of loss distributions that we're familiar with in interest rate modeling. You end up with one of our nice probability distributions. Then you can apply the same kind of metrics that you've used before. Does it work quite as neatly as interest rate modeling? No, but you can start to get your arms around it in a similar kind of way. This would be a complete system dynamics map for an information systems failure. It does start to get a little bit of a spaghetti code there. Part of the benefit is to get the people you're working with to start thinking about what can go wrong and who is affected and how. The final number might not be quite as important as the actual process. That's true with enterprise risk management in total.

In conclusion, both financial and nonfinancial risk can be quantified, just to different degrees. It's essential for effective integrated risk management. The title of my presentation was you can't manage what you can't measure. As actuaries, I think we agree with that. The process requires extensive modeling, generally stochastic modeling. The process also requires extensive communication coordination. Again, it might be outside our comfort zone, but it is absolutely

required to make this work. We can do all the models we want, but if there's no communication around it, then it's not going to do any good. Nancy has already covered the increased interest, and I've mentioned it on the part of the outside.

If you haven't started, start now, because as our data indicates, the vast majority of the companies out there are doing this. Those of you in the room are in various stages of this process. Maybe some have a process in place, and maybe some are just starting. I would encourage you to get on the train and make sure you're implementing best practice rather than waiting for some regulation to make you do it. If you wait, it's going to be too late. Valentina is going to tell us what the Society task force is doing.

MS. VALENTINA A. ISAKINA: I'm the Finance Practice Actuary at the Society. There has been a lot of work done on this particular task force since I started at the Society of Actuaries in March 2002. I'm going to just briefly touch on several of the items.

The task force has two goals. One of the goals is to make risk management a regular part of the actuarial practice. The task force is hoping to accomplish this in two ways: through development and improvement of educational materials for actuaries and through the advancement of the actuarial profession in risk management. That goes back to the comment on the chief risk officer concept. The task force has looked at some information and was able to find out something about the chief risk officer position that currently exists. Comparing the life insurance industry versus all the other industries, we see that about 70% of chief risk officers in the other industries come from within the industry. On the life insurance side and health insurance side, only about 15% of the chief risk officers come from the insurance industry itself. The task force decided that there is a need for a lot of education for both the actuaries and the broader financial service industry to make sure that they're aware of how much actuaries can offer in that particular aspect.

The second goal of the task force is to make sure that, ultimately, the risk management practices are as well documented and developed as calculation of reserves.

The process of the task force is twofold, and those two things are interrelated. The establishment of seminars on risk management and the development of risk management educational materials are kind of interrelated as the subgroups of the task force work towards their goals. Some ideas have developed that have been addressed at the seminars. On the other hand, if there is a very interesting idea that comes up during a seminar, it will go back to the task force to be addressed in more detail. So this is kind of a circular process.

There were two risk management seminars in 2001. The task force is very new. It was organized about a year-and-a-half ago. The first two seminars were relatively small. The big one was held on December 4-6, 2002. There are going to be both beginning and advanced risk management seminars as indicated. The topics that are going to be addressed are very crucial topics that we identified after having talked to the practitioners in the broader financial industry. We have recruited about 17 speakers at this point for this seminar in December, and about half of them are going to represent the insurance industry and the broader financial service industry, as the concept of risk management is being developed in the insurance industry.

We have two sessions currently scheduled at the Society of Actuaries annual meeting in Boston. If you go to the Boston meeting, it will be a good opportunity for you to learn a bit more about what the Risk Management Task Force is doing. There will be two sessions. One is the buzz-group that is a very informal interactive session. The other one is a workshop on the task force and the projects that have been going on.

The 2002 Advanced Risk Management seminar has less topics, but one topic that was not appearing in 2001 is the chief risk officer job. That is going to be a very important theme as the task force progresses in its work going forward. The topics are there if you're interested. I think it's going to be a great seminar.

When the task force was organized about a year-and-a-half ago, the task force identified about 30 areas where additional educational materials and opportunities are needed to be developed. Initially, there were only about a dozen people on the task force. They were all volunteers, and

they all had a lot of passion and enthusiasm, but accomplishing much with that small of a group was just impossible. The scope had to be narrowed, and eventually, the task force selected nine areas to pursue. It formed nine subgroups, and I actually know all of them by heart.

We have nine subgroups, and I'm going to briefly talk about what each of the subgroups is doing. The subgroup products can be one or several of these particular items. If your subgroup is interested in a particularly technical topic, it could be a research topic or technical papers. The project could lead itself into a topic at the Society of Actuary's seminar or a separate seminar on a particular topic if it's big enough. Several things could be organized into a specialty guide. As you will notice, several subgroups are working towards that. The task force can produce a risk management guide, like a current book on GAAP, however, it would include the risk management processes for actuaries. It can be a brief project, and the brief project is actually a very interesting concept. I don't know how many of you know about this particular approach, but it could be something that has already been done in a different industry or in a different economy or basic industry. Perhaps it has not been able to find its way into the life insurance or health insurance industry. So a brief project could take an already existing concept and kind of re-translate it for its application into the insurance industry. Some of the subgroups are looking at that approach as well.

The subgroups, as I mentioned earlier, started out very small. There were about a dozen people on the subgroup. When I started at the Society of Actuaries in March of 2002, as a finance actuary, my job was to familiarize myself with all the task forces that are falling under my practice area. So when I came to the meeting of the Task Force on Risk Management for the first time, the task force was talking about how it is attracting more people to the subgroup. I suggested sending out a blast e-mail to recruit people to volunteer. We had about 200 people volunteering to join the task force and about 100 of them have participated in the goals and are regular volunteers helping out with all the work. I think it's a record of some sort. With about 16,000 actuaries worldwide, 200 people on a task force certainly gives you a prospective that this topic is very relevant, very interesting, and needed to be addressed currently in the profession.

I'm going to start talking to you a little bit about the subgroups and what they're doing. The first subgroup is the RBC Covariance Subgroup. The leader of the subgroup is Jim Reiskytl. So if you're interested in more about what this subgroup is doing, you will have a chance to ask him more detailed questions. The focus of the subgroup is to determine the co-variance and correlation among various insurance and possibly noninsurance risks that will help to guide us in establishing a certain surplus target. The subgroup is working on several different research proposals. I was recently informed that the first research proposal on the dynamic co-variance and correlations as a function of time has been approved for research by the Committee on Finance Research at the Society of Actuaries. This is a very excellent result. Congratulations to Jim and his subgroup for all their very hard work on this. There are two other research projects that are in the works.

The next subgroup is also headed by Jim Reiskytl. This group address policyholder behavior in the tail subgroup. It's addressing how policyholder behavior changes under extreme conditions. This subgroup is also working towards several different research projects. As always, there are a lot of very good ideas flowing. The subgroup has to first determine its priority, its focus, and where it can start. As those projects move along the lines, it can always come back to something else and pick up other items. So these are the three research projects that the subgroup is working on: the life policyholder lapses, long-term-care policyholder lapses, and fixed and variable annuity surrenders and withdrawals.

What the subgroup has found is that a lot of the information that would go into a project like this depends on the availability of data. The availability of data is crucial for those particular topics. If a research project is approved, the first step in the research would be to identify whether there is enough interest out there. Are there enough companies willing to participate, and do they find this useful. This is going to be something that the subgroup needs to work on, and there could be even a survey going out to maybe all of you and asking you whether your companies find these projects interesting.

The next subgroup is the extreme value model. This is quite a technical topic. What the subgroup is concentrating on is how the current assumptions of normality in the distribution of insurance business affect the underlying risk of the business. As we all know, the insurance risk is not usually normally distributed. Oftentimes, in modeling, a normal distribution is assumed. The group is trying to address what the impact of that assumption would be. The ultimate project has not yet been determined, and everything is still in the works.

The enterprise risk management subgroup determines that its ultimate product is to develop a comprehensive framework for enterprise risk management. As you can imagine, this is quite a task. The subgroup has had some difficulty identifying how it should uphold this topic. What can it do? What they actually started with is an attempt to establish a communication process with other industries, including nonactuarial industries in the U.S. and other countries, to see what kind of enterprise risk management processes are already in use. One interesting thing that this subgroup has found is that the Casualty Actuarial Society has already done quite a bit of work on this particular topic. They appear to be two to three years ahead of us in the development on this particular subject. The subgroup is hoping to incorporate what the Casualty Actuarial Society has done already to see if some of the topics can be adopted and used by life and health actuaries.

The next subgroup I'm going to talk about is the economics capital calculation and allocation subgroup. This particular subgroup is concentrating on the context of economic capital. What they decided is to move towards developing a comprehensive guide for actuaries only on economic capital topics. The first step that the subgroup took was to develop a survey on the economic capital practices of the industry. This survey has just been completed, so if you're a member of the investment section, financial reporting section or risk management task force, you received this survey and were asked to participate in it. The survey was just closed. We had almost 500 responses to this survey, so it's an amazing response that I'm very happy about. We promise that we're not going to be discussing the results of the survey at this particular session because we promised that the people who responded to the survey will get a first glimpse at it.

We're intending to keep our promise and, if you're interested in more details on the results of the survey, there will be a session at the annual meeting where we'll address those results.

There is also the Risk Management Metrics Subgroup. This is a subgroup that decided to identify all the existing risk management metrics that are available right now. It might suggest new ones to be used by an insurance company. What the subgroup is hoping to do is identify those risk metrics and explain how they're currently used to talk about advantages and possibly short-comings of those risk metrics. They'll develop illustrations of how those risk management metrics are used and can be used or should be used in a practical type of application. Several of the risk management metrics that the subgroup is currently working on are already in progress. Several have been identified but they have not started yet. There are also several that the subgroup is still considering.

The Pricing for Risk Subgroup decided that it is really interested in how the companies out there are currently pricing for this in their day-to-day work. The first step that this subgroup came up with was to develop a survey over existing practices. How are the companies actually doing this? What type of items do they incorporate the risk into when they're pricing their products. The ultimate product has been a practice guide to address disadvantages and advantages of the current methods and what is happening right now. These are the problems the pricing for risk subgroup is addressing right now. There are possible items of how the companies are pricing for risk in their methods. The subgroup has just completed a survey that is going to be going out to investment section members, financial reporting section members and risk management members. The survey is going to ask you to provide your feedback on what's happening currently in your company. This is going to be a completely confidential survey. The SOA has hired an outside provider to do this, and the results of the survey will be shared with the participants. I think this is a very interesting survey that is coming up in the next two weeks or so.

The Equity Modeling Subgroup is one of the very recent subgroups that was formed. The equity modeling subgroup is addressing the equity risks. This is the risk that has received very much attention lately because of all the turmoil in the marketplace now. The subgroup decided to look

at what's currently out there in equity modeling and how much of that can actually be translated from the existing very complicated financial literature on the subject. What can be applied to the work in practice for actuaries with the ultimate product of going toward the practical guide on the equity modeling and measuring of risks geared towards actuaries?

The last subgroup of the task force is the latest subgroup that has formed. The Health Risk Management Subgroup is two or three months old. The reason it was formed was because some of the health risk management actuaries on the task force held that the current subgroups were addressing their needs to the appropriate extent. They stepped forward and were willing to take the lead on this. The ultimate product has been determined. There was a little survey that went out from the subgroup, and the members of the subgroup, about 50 of them, determined that they would like to produce a comprehensive practice guide for health actuaries with several things that they want to address. These things are: the chief risk officer concept, some solvency and liquidity concerns, and additional modeling tools in the health insurance.

So what's the future of the risk management task force? As I said, this is completely a volunteer effort, so it totally depends on the continued interest of the Society of Actuary's members. Marginal development is needed, and new topics are constantly coming up. There is still quite a bit of interest, and quite a bit of material that needs to be accomplished. The task force is very busy. At some point, it took about 70% of my time to keep up with it, so there is a lot of work that is happening. What we actually found is that there is really no substitute for the cooperative work of practitioners. We can do so much together. It has been really amazing. What I found out is that the volunteers that we have on the task force or in the subgroups are truly amazing volunteers. We have a very wonderful group of people with experts on one side that know so much about a particular topic. We also have a very large number of enthusiasts who are willing to learn about the topics. The combination of the two produces an incredible result of being able to move all this very interesting and dynamic process forward very fast.

Another very interesting thing about the task force is that it does not dictate what the subgroups should be working on. It does not dictate the topics, it does not dictate how it should be accomplished, and it's completely grass-roots driven. If you're interested in something, speak

up, volunteer, and if there is enough feedback and enough additional interest in these things, know that new subgroups are being formed, new topics are being produced, and work is moving along.

Some potential future directions for the risk management task force are areas like embedded value, fair value, credit risk from the company prospective, and company-owned credit risk. Things are happening. If you're interested in the risk management task force, the investment section is hosting the website for the risk management task force. You can go to the investment section on the website and see different subgroups and what the task force is working on. At the end, we are going to produce a website for the task force itself. That's in the works as well.

MR. LONGLEY-COOK: Thank you Valentina. Clearly there is a lot of work being done. We're going to open the discussion up to questions for the panelists.

MR. KERRY A. KRANTZ: As I was listening to the presentation, I wrote down a couple of words—one was feedback and the other was noise. One of the problems with three-day value-at-risk is that it's too short a period. One of the things I was always concerned about when we did monthly statements at insurance companies is that no matter what I did, it was wrong. I wondered why we were bothering with it because the noninsurance company parent was a bank and it thought that more frequent reporting was better. The other thing is feedback. You can measure all kinds of things and price them, but unless you have a feedback loop, you never know whether or not your projections are meaningful. You can give answers to questions of where we are going, but you never know if you got there or not. I'm just wondering how you look back on these models to see how well you did.

MR. LONGLEY-COOK: Since it's related to metrics, I'll start. Then the other panelists might want to add something. The question about duration of the horizon is a key one. Value-at-risk, as I mentioned, is generally very short. It's usually about three days, because it was developed to get a handle on the risk exposure in trading portfolios. Let's say you have a portfolio of

derivatives. Management compliance oversight wants to know how much money they can lose before they unwind the position. It might take three days to unwind the position in an orderly way, so that's the time horizon. If you're trading derivatives, then that's the kind of time horizon you have. I mean you sort of win or lose in that short period of time. Banks with best practice risk management literally know at the end of each day what their VAR is. Perhaps in your investment management areas, they do the same for their volatile portfolio.

If we adopted that approach for asset/liability management and insurance enterprise, we'd get nothing but noise. Is one year too long? It is something on the one quarter, six months, or one-year time horizon. I think it makes sense, and it sort of fits in with the kind of modeling we do and some of the feedback mechanisms that we need to take that long. The problem is that a lot of the mean variance co-variance formulas like value-at-risk only work for short durations. You're looking at sensitivity over a short period of time. Maybe the formula that's used begins to break down once you move beyond a few weeks. So you're balancing short durations where you get a lot of noise and long durations where a lot of the relationships break down. If you're going to the longer duration to get out of the noise and get something meaningful for insurance enterprise, you really need to move beyond those mean variance/co-variance formulas like risk metrics. You need to run 10,000 scenarios and take a look at the mean of those, capturing the embedded values. Let's see how much the risk driver can change over a year and then shock the system. Run them again until you can get the kind of metric that I'm talking about in economic value at risk. So maybe that addresses some of your first question.

The second question about feedback is a very important point. Unfortunately, we don't do very well with that. I know from my experience that everybody wants to work on building a model, but nobody wants to work on seeing if they did a very good job. You're always working on the next round, or gearing up for this year-end. Let's take a look at how last year-end's modeling worked. This is really important in areas where you have some company experience or industry experience to look at. Take disability incidence termination rates. It would be great to take a look at how well your models did in that regard. There is lapse experience and expenses. These are all areas where you can check on what kind of job your models are doing. Maybe that addresses some of your question.

MS. BENNETT: I think the only comment that I would add is that I think the feedback is, in some ways, the most important aspect to the whole process. If you can't take a step back and say how well did you do, eventually your process and all your results are going to just become meaningless. They're not really going to add that much value. You're really talking about the quantitative measurement and the qualitative measurement. I completely agree with Alastair's comments that a lot of companies are not interested in taking a look back at how well their models did. They always want to look ahead. You hear, "We'll do better on the next cycle, but don't drag us back to history that's maybe six months or twelve months old." I think it's important to first set up a formal process to quantitatively validate the model." How well did we do in predicting what the future will be? I think it's also equally important to have a qualitative assessment because you're going to miss something in the model. You can never rely completely on the model. You need to have some process where you sit back and say, what could we have done better? Could we have had better information or a different process so that we might have known this? You might conclude that you just couldn't have possibly predicted something. I think you have to have both that quantitative and qualitative feedback.

MR. ARMAND M. DE PALO: Alastair, I'd just like to give some observations. As actuaries, we sit here and we think about models and we think about products. We also have to realize that the idea of coordinated corporate risk management will make the actuary's role only a component of the overall system. While this work is important, it's just one of the building blocks. The industry hasn't had a corporate buy-in on risk management. What is happening in the insurance industry has been risk management. You put limitations on how much the investment office is going to invest in one asset. You set up retention limits so that you don't take more risk. In general, the liabilities that the company had were all related to what I will call a truly independent random variable. All of those are interesting because the industry is moving in new directions. Even the fundamental concept of an independent random variable, where if you write more of something, it's good, has moved to a nonindependent, nonrandom variable where if you write more of it, it is bad. The industry doesn't fully note it. At the end of the day, this is an expensive process. If the process is done down low in the organization, the risk

manager will be basically ostracized from the marketing people because he's the harbinger of bad news. Actuaries tell the truth and know the truth, but the message doesn't get through to anyone who wants to believe you.

I've asked around at different companies to determine whether they have risk management. Guardian is in the process of building a risk management committee. I'm doing more work on this than most companies are. Getting the whole process to have traction is hard because you have areas that are operational. They believe this is just another level of internal auditing. I had an idea, and I am still pursuing it. As a corporate risk committee, you need to have some input or interrogatory done periodically by the profit centers for different lines of business knowing how you are. Then you designate somebody to fill this out. That person is going to be at odds with the head of that profit center whose probably a marketing person. Where does this all take you? If you don't have a buy-in from what I'll call the audit committee of your board, and if it's not integrated from the board down, you will not have the funding, the support, or the clout to make this work.

Both Tillinghast and Milliman have done a lot of good work on this. I've reviewed almost every paper that has been written on this subject. I've looked at the bank stuff, and it does not translate well to the insurance industry. We have to do risk management. However, if you don't have at least a corporate oversight, which is the chief financial officer, the chief legal officer, the chief actuary, and a few other people setting policies, and then have a policy, which is like a mission statement, go down to an operating statement and from the operating statement, go to a process, you're not going to have it integrated. I've asked companies whether they have risk management, and you'll find out that one company's idea of risk management is worrying about transactions in the claims department. There's risk management, but that's risk management down here. There is not corporate risk management. You have to be careful when someone says they have risk management. You're probably going to find out it's not risk management that the industry needs to go to. Why is this important? It's just a matter of a year or two before some board is going to be asked, what is the opinion of your risk committee? Then they're going to

look around and say, do we have a risk committee. There's no doubt it's going to happen. It's a question of what level of commitment and funding there's going to be from the top of the company to have this.

I'll give you a very simple example. The 100-year flood. No one is really interested that much in a 100-year fund because it's one chance in a hundred. If a 100-year flood happens, there's a 50% chance that you're going to have another 100-year flood in the next 50 years. It is important to get these ideas out there. However, say that you're a manager of a company, and you say, "I have 10 years of tenure with the company. Why are you telling me about these tail events of the company going solvent?" It needs to be driven by a process of constant scanning. The actuary is just one of the components of it. It's not just product, it's external risks. There are internal risks, operational risks, regulatory risks, and legal risks. These forces must be brought together. As actuaries, we can have wonderful models, and tell them about the risk. We can tell them about VAGLBs and how there's a tail risk on them, which is as scary as can be. However, if no one is listening, we're going to have the nice models we have, and we're going to forewarn them. That's my message.

MR. LONGLEY-COOK: A very good message. Thank you. Nancy, do you want to add to that?

MS. BENNETT: I totally agree.

MR. LONGLEY-COOK: I'll just add one or two comments. I agree with Armand. What we've seen in the surveys, in our consulting, and in my own interaction with other companies when I was at Aetna, is it seemed like for the last five years there has been a lot of talk, but not a whole lot of action. I think the difference is that we are now seeing the action. I think the survey starts to show that, and our own practice starts to show that. There are some recent problems that some companies have had. One of the drivers is the requirement that the CFO and the CEO sign off on the financials. Another one is the recent very large write off by a major reinsurer on their

exposure on guaranteed minimum death benefits GMDBs. I think a lot of senior executives are now interested. Armand is absolutely right. Unless it's driven by senior management, it will be marginalized to the back room.

FROM THE FLOOR: I just wanted to second what Armand said. From a regulator's perspective, I know that there are complaints of overregulation. If a company has a model like this in place with a feedback loop, a regulator could look through it to see that he or she does not need to regulate you because you're doing it for yourselves. That would be appreciated. As a selling point, this would help. The regulators would be on your backs less if you had this.

CHART 1
Probability-of-Ruin Threshold Versus CTE

