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### Session 100PD

## Risk Management Practices Concerning Variable Annuities With Guaranteed Living Benefits

**Track:** Investment

**Moderator:** HUBERT B. MUELLER  
**Panelists:** FRANK C. CLAPPER, JR.  
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*Summary: This session discusses risk management practices concerning variable annuities with guaranteed living benefits (VAGLBs), specifically:*

- *Exposure of insurers with VAGLBs*
- *Reserving and risk management practices concerning VAGLBs*

**MR. HUBERT B. MUELLER:** My name is Hubert Mueller and I'm a principal in the Hartford office of Tillinghast–Towers Perrin, with responsibility for our financial management practice in North America. Our panelists include Frank Clapper from AXA Re, Rodney Clark from Standard & Poor's (S&P), and myself. I'll start by giving an overview of the market and some of the risk-management issues that you may want to think about. Frank will give you a reinsurance perspective. Rodney will go last and give you S&P's views on guaranteed living benefits, which is a hot topic right now in the marketplace.

I'd like to give you an overview of what's going on in the variable annuities market with guaranteed living benefits. What do we see in the marketplace, and how can you look at this from a risk management perspective? What are some of the things you should think about? Clearly, variable annuities have seen tremendous growth during the last decade. Premium considerations between 1992 and 2000 have increased from \$29 billion to \$135 billion. With the exception of one or two years in

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**Note:** The chart(s) referred to in the text can be found at the end of the manuscript.

the mid-'90s when the stock market was going sideways, growth has been almost unstoppable until 2001. In 2000, there was still about a 10 percent growth in premium, even though the market was down. That growth came to a halt in 2001, with sales declining by 16 percent to \$113 billion. Nevertheless, 2001 still showed very respectable figures. Sales of \$113 billion is still more than 10 times the premiums of individual life, which are about \$10 billion a year.

What guarantees are typically offered in the marketplace? Well, first you have to distinguish between death benefits and living benefits. Clearly, today, we're talking about living benefits. We're not focusing on death benefits, but just for completion I will also mention them. Death benefits include guaranteed minimum death benefit (GMDB) and the enhanced earnings benefit (EEB). EEB pays your tax or pays taxes to heirs when people die and there's a gain in the contract. A spousal step-up death benefit (SSDB) feature is something that maybe not everybody has seen yet. I know of at least one or two companies that have offered this feature, which gives the surviving spouse the right to take the contract over at a cash value equal to the death benefit of the contract when his or her first spouse dies. So you actually have a chance to step into a contract at a higher level than the contract was before.

Focusing on living benefits, there are four that I'm aware of, but there may be more. The four main ones are a guaranteed minimum accumulation benefit (GMAB), guaranteed minimum income benefit (GMIB), guaranteed payout annuity floor (GPAF), and a guaranteed minimum withdrawal benefit (GMWB). I'm not sure if the first three require a lot of explanation, but I think the last one may. The typical design of GMWBs allows the contract holder to withdraw a fixed percentage of the premium for a fixed number of years. For example, seven percent of the premium might be withdrawn for 15 years, which, in total, is like a premium withdrawal guarantee. It is also worth noting that compared to death benefits, living benefits have not reached prominence in the marketplace—at least not in the U.S. However, in Canada, segregated fund products all have accumulation benefits, so the typical contract design in the Canadian marketplace does include a guaranteed minimum accumulation benefit by definition. For a contract term of 10 years, the contract holder is guaranteed to get 75, 90, or 100 percent of the premiums back in a segregated fund contract.

What are some of the risks that come with these products and with these guarantees? I've classified them into four different categories.

**Economic risks** include the downside risk from the payout of guarantees. The payout if that guarantee is coming through the fund value is actually less than what you're obliged to pay as an insurance company. It is probably a safe assumption now that everything which was sold in the last three or four years is "under water" with respect to the guarantee. In other words, wherever the current guarantee is, the fund value is below that. Certainly, this situation has been exacerbated by the market development in 2001, but it had already started in 2000.

The other economic risk is that if you have a significant amount of assets in variable products, e.g. variable annuities (VA) and variable life, there is a revenue loss in terms of the fee income (which is typically fixed in basis points of the underlying assets) if your assets drop. So, for example, if you had \$10 billion of assets six months ago and you now have \$9 billion of assets, you've just lost 10 percent of your future fees. We have a number of players in North America who have VA assets exceeding \$40 to \$50 billion, so the potential revenue loss is quite substantial.

I would also like to discuss accounting risks. These include revenue or earnings volatility, because you have fluctuation in terms of your economic revenue. The fact that there is volatility in the results is not something that is looked at very positively by financial analysts who follow your company, if you're in the public domain. So even if this quarter is down, you will typically be asked questions such as, what can you tell us about the next couple of quarters? There was a recent analyst call for a publicly-quoted, mid-sized U.S. company, in which the CFO was asked that exact question from an analyst who said, "You've disappointed us in earnings repeatedly. What can you tell us about the next couple of quarters? When are you going to reach your earnings target?" The CFO on the public call said, "We will reach our targets when the economy turns around." I'm not sure that was the best of answers. Clearly, there's very much of a focus of the marketplace on your revenues and how you manage them.

Another accounting risk from a regulatory perspective is having volatility on the asset side. In this case it means having reserve volatility, because assets and reserves are both marked to market. So if the assets move, the liabilities move. And there is much more of a focus of the regulators on companies and what they do in this market. There's much more interest in doing everything the law says and how you look at the risk management of these products. For example, New York has gone a step further and said, even if you have reinsurance for some of these guarantees, what do you know about what the reinsurer does? Just having the reinsurance doesn't take you off the hook, because if your reinsurer doesn't do a good job, you're ultimately going to be liable if the reinsurer can't pay.

There are also operational risks. Some companies that are focused exclusively on equity-based products have a bit of a problem right now in that the market's down, sales and persistency are down (because more people are cashing in) and expenses are flat. It's kind of a dead-end street and there are more companies that are focusing again on the fixed annuities marketplace as an alternative. There are also some issues in terms of lack of adequate control procedures, which could cause some problems, too, in this market, especially if you're focusing exclusively on equity-based products.

Chart 1 is an example of the potential revenue loss in an adverse capital market scenario. It is an example for a \$100,000 single premium variable annuity, which is probably a little above the average market size. The green line shows the mortality

and expense (M&E) revenue on an expected basis. And the expected basis here assumed equity growth of about 8 or 8-1/2 percent over a long-term, which is an assumption that probably about a year or two ago almost everybody thought would have been a decent assumption, probably even conservative.

We then did a sensitivity assuming that right after the issue of the contract, the market drops by 10 percent, and then stays at that level for 20 years. What's the difference in the M&E revenues that you get as a company? Well, the difference on an annual basis is the black line and accumulated at 6 percent, which is supposed to be a risk-free rate, is the red bar. And the difference on a present value basis is the blue line versus the green line. If you accumulate this over time, it adds up to about \$5,000, which is 5 percent of the original single premium. I doubt that any contract out there had a 5 percent profit margin to start with. What this says is although you had expected a profit at issue, under this market scenario there's no profit there. Thus, having a fixed basis point margin on the assets under management does not guarantee you profitability.

What are some of the market developments here? As I've mentioned before, there is much more focus by the rating agencies and the regulators on what companies are doing in the marketplace, e.g., New York and Connecticut are focusing on that issue. Overall, there's much more regulatory attention on what companies are doing and what the capital markets activities are in this marketplace.

The New York State Insurance Department (NYSID) has done a survey on risk management practices for variable annuity guaranteed living benefits (VAGLB) products. What was actually sent out at the end has been significantly reduced compared to the original version of the survey because of a lot of discussions with the Life Insurance Council of New York (LICONY). But, clearly, there is increased attention on this topic in the marketplace. S&P incorporates risk assessment into their ratings as well.

In Canada, if you have certain guarantees and you can prove that you have a sound hedging process in place, the Office of the Superintendent of Financial Institutions (OSFI) will give you some offset to the regular capital requirements. And, interestingly enough, the Academy has a task force on this topic, too. Phase two of the C-3 requirements, which are currently being worked on, would also include giving companies some credit for the normal capital requirements if they can show that they have a working hedging process in place for those guarantees. But that's still in the works and probably will not be effective until 2002. I have also seen situations in which companies have been forced to increase their product fees to make up for some of the bells and whistles that have been provided. This is a step in the right direction. For too long, the industry has been giving away a lot and has not been asking for anything in return.

The volatility of the equity market is something we're all aware of. We've seen it since the beginning of 2000. This has put pressure on earnings. At the same time,

almost all of the reinsurers have been pulling out of the market. It's not that easy to get reinsurance today. There may be some recent new entrants, but they're relatively small still. And from a direct writing perspective, even if there are one or two companies in the marketplace, you also have to look at counter party risk and you may not get the reinsurance for everything you're asking for. So, clearly, reinsurance is part of the solution, but may not answer all your needs from a risk-management perspective.

What are some of the issues that you're looking at in terms of the risk management of these guarantees? You have different options and very often it's not doing one or the other, but doing a combination of things, depending on when you started selling variable annuities. I have been working in the variable annuities field for 15 years. We were pricing products in the mid-'80s. Most of those products had the return of premium death benefit feature. If you sold that in the mid-'80s or even in the early '90s, you're probably okay on that block of business. If you look at the runoff in funds, even if you have a prolonged period in which funds don't move very much, you're probably still looking okay and you can just hold some capital against that and manage it on that basis. But the more your products move into recent history, the more your guarantees are going to be at risk (or under water). I would say that up until September 2001, a lot of companies were comfortable using this kind of self-insurance and saying, "We're monitoring the risks," and "We're okay." But we've gotten a lot of calls in the last six weeks where companies are saying, "We need to talk, there's more going on here."

Clearly, reinsurance is part of the solution. Capital market solutions, i.e. buying static hedges, are another risk management strategy. The investment banks are quite active in selling options to cover some of those guarantees. However, typically, you won't get the time horizon that you're looking for, or it's just too expensive. If you price at current volatilities, you may be paying a hefty premium above what you priced into your product originally, so you can't afford to hedge long-term. Also, the capital markets don't offer you static options past one or two years at the long end.

Another strategy that is increasingly being used is to reduce your company's risk using a combination of static and dynamic hedging solutions. Static hedging works, except for the situation between one quarter and the next quarter. A lot of companies would like to manage their exposure more regularly, e.g. monthly or weekly. The situation may change a lot on a daily basis, so in between you're at risk and you have to be comfortable managing the risk on that basis. Dynamic hedging may not always be the best solution, but it's one way to have a more dynamic and real-time approach to managing guarantees.

I've seen securitization solutions as well. There are more investment banks and, to some extent, reinsurers in the market offering that. You may also have opportunities to hedge liabilities purely from a product design perspective. For example, if you have equity-indexed and variable products side-by-side, there may

be some offsetting liability features that will allow you to only hedge the net exposure and not each product on its own. It would be too much to go into the technical details here, but you can look at it on that basis and some companies are starting to do that.

Finally, consolidating different risks in a different line of business may give you some additional liability offsets. Clearly, insurance companies are in the market to take risk. But, you need to be aware of what risk you're taking, you need to be able to monitor the exposure you have, and you need to be adequately paid for it. You can break down the risk-management process into five steps.

The first step is to understand the risk and be able to quantify the risk exposure. That's where a lot of companies are still struggling right now. Many are asking, where is our exposure and how do we as a company define risk? What are our risk tolerances and constraints? If you can't answer those kinds of questions, you can't do a risk-management process, because you don't know what you're trying to do. So, you've got to start by asking, what are our risk tolerances? What are we willing to take in terms of risk? What's risk for us? Risk for a quoted company may be that this quarter, you're missing your earnings by \$.05, because it could well mean that your stock's going to drop by 25 percent. Risk for a mutual company may be totally different, and you may have a more medium or long-term perspective. You then need to decide what risk exposure is appropriate to take, and look at the various options that we just discussed. Finally, you also need to put adequate policies and procedures in place. Formulating and implementing the risk-management strategy is not a one-time effort, but you need to put the appropriate policies and procedures in place so that you can actually monitor the exposure going forward.

What do we see companies doing in the marketplace right now? Many writers in the marketplace are running the risk naked. A different way to say it is to say they self-insure. Some in-force business is still reinsured, but most new business exposure is retained. After all, I think almost everybody in the marketplace was reinsuring with one very large reinsurer that was offering very competitive quotes for a long time until it dropped out of the market. And some of that is still around on your in-force.

Reinsurance is available, although there are some limitations. You may not be able to cover the tails. Frankly, nobody wants to cover the tails, as we all know. And if you look at who's hedging and who's doing what, we have seen a number of companies in the U.S., Canada, and Europe starting to use dynamic hedging. In the U.S. we know of about seven to 10 companies that are in various stages of using dynamic hedging and at least a few more that are in the phase of mock testing. This means they're not going live yet, but they're already evaluating different strategies. And in Canada, we are aware of at least one company that is using dynamic hedging actively in the marketplace. A few other companies are mock testing, and at least a few more are doing various feasibility studies.

With that as introduction, I'm going to turn it over to Frank. Frank Clapper is vice president and corporate actuary with AXA Re in New York. Frank has been in his current position for about 30 months and has responsibility for valuation and actuarial oversight on financial reporting, pricing, risk management, and investment.

**MR. FRANKLIN C. CLAPPER JR.:** I'm going to be talking about a number of risk-management tools, how they interrelate with each other, and how reinsurance comes into play. I'm also going to talk about the valuation and capital requirements, especially dealing with how reinsurance impacts those.

As Hubert said, risk management is a comprehensive thing. It involves a lot of elements. It starts with the design of the product. Some benefits are riskier than others. And, of course, the pricing plays a role. You cover a high or low range of expected results through your pricing. Underwriting is a word we use internally. It doesn't mean health underwriting or even financial underwriting. It's a broader concept. Beyond the pricing and the product design, it's what we do to limit the risk up front, with such things as how we sell the product, how we present it to the policyholder, and so forth. Once you've sold the product, you need a good administrative system to keep track of all the details or you're not going to be able to manage the risk. That's a basis for managing the risk. You need good valuation software and modeling software to measure the risk. Then you also get into other risk management tools, such as reinsurance and/or a hedging program. And we don't promote the idea that reinsurance is the only solution to anything. We think it's part of the package that should be considered.

In any analysis of risk on this product, you have to differentiate by the benefit type. Often the benefits are divided into two types, what we call non-path-dependent or path-dependent. It simply refers to if you know what the benefit is going to be ahead of time or not. If it's not path-dependent, then the actual amount of the benefit can be determined at issue. But there are many benefits out there in which that is not true. In these the amount of the benefit at any point in time depends on the path you take to get there. Those are considered more risky.

Another element of product design is that, in this product more than some others, we reach a point in which adding more features is not necessarily more valuable to the policyholder, since the cost of those features is far beyond anything he or she wants to pay. We get into the issue of the policyholder's perception of the risk versus ours and versus the financial markets. It's important to consider that when you're designing your product. You must be cognizant of where you cross the threshold between good value to the policyholder; because, eventually, somebody's going to have to pay the price.

The most important element of the product design is the aggressiveness of the guarantee itself. An extreme example would be a simple return of premium versus a combination of a ratchet and an 8 percent roll-up. That's pretty risky, and I don't

really know anybody who's selling it. Waiting periods affect it. Usually, on the living benefits you have a fairly long waiting period before anybody can collect—7 to 10 years, typically. There are also age limits on annuitization. There's also a feature where the guarantee is only on the initial premium or maybe premiums that come in during the first contract year, but nothing after that. If you put in a premium after that it really is like a separate policy, and that's important, too. You can't guarantee the same level of benefit on money that comes in later on.

Now, I am going to talk briefly about hedging versus reinsurance. I have my point of view and everybody else has theirs. There are some advantages to hedging. The one that's talked about the most is that you don't have to pay the reinsurer any money for overhead and profit. But I also see an advantage in the fact that sometimes people fear that if they buy reinsurance, they're paying too much. Well, if you don't buy reinsurance you'll find out pretty quickly how much this benefit costs. You will be aware of the cost by dealing with the financial markets or by taking a hit on your results.

There are several disadvantages of hedging and they are important when you're considering your overall risk-management program. The first one that is there all the time is the basis risk. That means that the securities underlying the liability are different from the securities underlying the hedge that you might buy, and that's usually the case. Another one is the duration. You're dealing with relatively long tail liabilities here—7 to 10 years—versus options that usually don't go that long. When you're hedging an insurance product—and all these are insurance products, even though the major risk might be financial, they are insurance products—in order to hedge it effectively you've got to estimate your insurance assumptions pretty closely (i.e., lapse, mortality, annuitization, etc.). If you don't, then your hedging program is not going to be effective, no matter what you do. Finally, no matter how you set-up hedging, there's a big cost for it in your operations. You've got to set up a control structure that's probably different from anything else you've done before. You'll get into conflicts with the investment area. Who's going to be responsible for it, the investment area, the product area, or what? In any case, there's going to be a lot of additional overhead that you didn't have before.

Reinsurance has some advantages. We cover all the risk, not just the financial risk. It's easier to set up and administer than hedging. Another thing is that the accounting on reinsurance, although not absolutely clear, is clearer than it is for hedging and it's more favorable. In the reserves you do not get any credit for hedging. You get full credit for reinsurance in terms of cash flows. The same is true of required capital. Right now in Canada on paper they give required capital a partial credit, but nobody's getting it yet, because they haven't satisfied all the criteria for getting it. In the U. S. we're talking about a similar structure that is further off.

In dealing with reinsurance, what kinds of reinsurance are there? The usual types are coinsurance, modified coinsurance (modco), risk-premium reinsurance, and



nonproportional features. I'll talk about each of these. First of all, coinsuring a variable product is probably not done. This is simply because the reinsurer doesn't want to set up its own separate account, which it would have to do to support the product. That's what coinsurance means. The reinsurer has its own assets supporting the liabilities on the whole product. That's not done on variable products as far as I know.

Modco could be done in which the ceding company keeps the assets and the reinsurer collects the investment income on a separate account and pays allowances and so forth, just like other modco arrangements. Finally, you could have co/modco, where it's sort of like a financial reinsurance deal, in which you treat the underlying policy on a modco basis and just the guaranteed part on a coinsurance basis, where the reinsurer could keep the general account assets backing the reserve.

The form of reinsurance that is most common is what I call risk-premium reinsurance. In this case, only the guarantee is reinsured. There's sort of an analogy with typical YRT on ordinary life. You pay a reinsurance premium that is directly related to the risk. It might be based on the account value, the guaranteed amount, or something in-between. The reinsured benefit is the net amount at risk, not the entire death benefit. The reinsurer pays the excess, if any, of the guarantee over the variable account.

I have some graphs that illustrate this point on how reinsurance works. Chart 2 is a typical GMIB.

In this case, I've used the roll-up. I don't even remember what percentage it was. It's probably about three or four percent.

Chart 3 is the same data after reinsurance, so you do have some depression in the revenue line. It's still fairly smooth and, of course, the benefits after reinsurance are, basically, zero.

Looking at it a different way, Chart 4 shows the difference between the revenue and the benefits. Cumulative is on top and the simple difference is on the bottom.

Chart 5 shows the same thing after reinsurance. Revenue less benefits is a fairly smooth curve. It gradually gets less. Revenue less benefits cumulatively just keeps climbing. This is just a simple illustration of what reinsurance can do for you.

Finally, a discussion of reinsurance would not be complete without talking about nonproportional reinsurance features, which are included in most reinsurance treaties. There can be a floor on the revenue. Sometimes a ceding company, in order to reduce costs, wants to have a deductible and that means that it retains the claims up to a certain level and then the reinsurer pays the rest. A If they're not interested in reserve credit, you can design a deductible so that most of the

reserves stay with the ceding company and the reinsurer has a different kind of reserve, but not the primary reserve. There can be per policy claim limits and aggregate claim limits. If you're talking about a GMIB there can be an annuitization limit. There are simple forms of stop loss on this product in which the reinsurer takes only a catastrophic risk.

I'd also like to talk with you about how the valuation is done and how the reserves are calculated. There are several different ways that you can value this product, and they're all mentioned. One is to do a complete stochastic valuation. You do stochastic projections and, basically, take the greatest present value of cash flows at some high percentile, between 80 and 90, say. This is perceived by many people to be the most accurate way of valuing the product, and it will recognize all the product features and contingencies that you could have.

One of the disadvantages of doing stochastic testing (and people often don't think about this) is that any stochastic model isn't any better than the assumptions you put into it. You've got to be pretty clear about that and make sure that your assumptions are good and fit together well before you can really use the results. It's also very time consuming. Once you've done it, it's hard to tell whether you did it right or not, sometimes. You've got to do a lot of checking to make sure that you did it right. In any case, even if you do everything correctly and you get the right assumptions and so forth (I've heard this discussed over and over again in conference calls), the results are always subject to interpretation and judgment.

One valuation method that's very attractive, in this case, is the retrospective method, which is the accumulation of premiums minus benefits. Some companies are using it selectively. The premiums used in the reserve are the actual paid premiums, and the benefits may be either on an expected basis or an actual basis, depending on how you use this method. This is often used for a GMIB. At one point, it was stipulated that we had to floor the reserve as the accumulation of premiums. That's been on and off the table, but it's still out there. A retrospective method is very easy to calculate and it's easy to explain to people. The earnings patterns are going to be smooth because you made them happen that way. If you accumulate 80 percent of the premiums, then you're going to have a 20 percent profit. It's very predictable. The disadvantages are that sooner or later the reserve is going to be either insufficient or redundant and you don't really know which until you test it. You have to use some other method, ultimately, anyhow.

Finally, we have the usual form of reserves, which I called deterministic prospective methods, as opposed to stochastic prospective methods. For example, the Guideline 34 that's used for death benefits is a deterministic prospective method. It happens to be a gross premium reserve instead of a net premium reserve, which has an impact itself, by the way. These methods are still easy to understand and calculate. They will adjust for your experience along the way. One of the criticisms of this method is that it's too volatile for this product. That's something else you have to think about. If you have good experience, however, this method will eventually tail

right off to zero and you'll release all your reserves. So, there's no problem with that. It is volatile, as I said. When the stock market goes up and down, the reserves go down or up accordingly. And if experience is bad, some people feel that this reserve is insufficient to deal with it, but that's why we're dealing with capital and reserves at the same time rather than just reserves. The reserve is less useful here than it would be on other products. The last disadvantage is that this method may not be applicable in all situations.

Specifically, what does Actuarial Guideline MMMM (Quad M) say about reserving for living benefits? It takes the same approach to living benefits that Guideline 34 takes to death benefits. This is part of the integrated Commissioner's Annuity Reserve Valuation Method (CARVM) framework, which really comes from Guideline 33 for variable annuities. The reserve for the guarantee, in total (from all guarantees), is the difference between a CARVM reserve with the guarantees and a CARVM reserve without the guarantees. All the guideline does is give you some guidance in how to calculate that.

You have the option of using stochastic reserves if you want to. However, the guideline went on to say how your stochastic model should work. This is a more prescriptive than you might expect, particularly in the equity return model or all the returns, really. They have to be calibrated to meet certain criteria. The idea originated with a Canadian paper, but it's been adapted to U.S. practice. We did not use that verbatim. In particular, we're dealing with U.S. securities, the kinds of things that underlie these products. There are calibration criteria. What might surprise you is that there are calibration criteria at both ends of the curve. Not just the down scenarios, but also the up scenarios, and that's to ensure that your model has adequate volatility built into it.

If you don't want to use the stochastic projection you can use the keel method for any non-path-dependent products, such as a typical return of premium or a roll-up benefit. It doesn't really matter how high the roll-up benefit is. That's not a problem. The only question is whether it's path-dependent or not. This is called the Safe Harbor. All the keel method does is give you a formula for calculating the gross returns for each subaccount that you will use in your deterministic projection. It's lognormal-based, and it recognizes the volatility and the mean returns according to stipulated assumptions that have been developed by the Academy committee working on this project.

If you cannot use the keel method or you'd rather use your own scenarios, you can use what are called representative scenarios. They are a generalized form of the keel method in which you develop your own scenarios that satisfy the same criteria as the keel method does for the Safe Harbor products. The keel method was developed to produce reserves that are the 83 1/3<sup>rd</sup> percentile greatest present value under a stochastic analysis. If you use representative scenarios different from keel you have to satisfy the same criteria. You have to certify these scenarios and you have to recertify them each year.

How does reinsurance come into play in calculating reserves? According to the guideline the ceding company has to calculate the reserve with and without reinsurance and the difference would be a reserve credit. However, the credits may be negative. For the reinsurance portion of the calculation, you treat the benefits as a reduction to the direct benefits, and the premiums become positive direct benefits, so it makes sense from a charge and credit point of view in the analysis. There's also some commentary about what the reinsurer should do. On risk-premium reinsurance the reinsurer is looking only at the reinsurance premiums and benefits and not the whole policy, so CARVM isn't as important in that context. But they need to take into account the greatest present value of the benefits less the present value of premiums. The guideline also says that if there are non-proportional elements in the reinsurance agreement, they need to be recognized. It can't go into a lot of detail because there are too many variations on that theme for the guideline to cover.

I've talked with a lot of ceding companies and a lot of other people about reserve credit. I'm sorry to disappoint people, but in this case, the idea of reserve credit taken literally doesn't make sense. The guideline says that it's the difference between the integrated reserve with reinsurance and the integrated reserve without reinsurance. If you actually calculate that at the inception of the policy, you'll find out it's negative. Why? The reinsurance premium is guaranteed to cover a lot of benefits. Naturally, the present value at the reserve level is going to be negative because it's a lower percentile than that on which the premium was calculated. That's if it's calculated upfront. Later on, there can be a positive reserve credit as the reserve gets bigger and the present value of benefits for the reinsurer exceeds the present value of premiums, but upfront it's almost certainly going to be negative. Mirror reserving often doesn't work. That is where the reserve credit equals the reinsurer's reserve. Initially, that's because it's negative, but it can also happen because of some differences in assumptions.

I'll talk a little bit about risk-based capital (RBC), but first I want to tell you about the interim formula that was put into place a year or two ago. For living benefits there's a factor that you're supposed to apply to the entire reserve. That factor varies according to whether the policy's in the money or not and whether you do an Actuarial Opinion. Of course, there are problems with this formula because it is too simple. There's no variation by benefits and no variation by level of revenue. There's no variation for the degree of being in the money or out of the money. It's either one or the other. This method is being revised by the C-3 subgroup of the Life Risk-Based Capital Task Force.

The committee is working hard to solve that problem and we are coordinating with the VAGLB group. That's an important point. This is the first case, perhaps, of coordinating reserves and required capital so heavily. We're doing this because we have no choice. It's very difficult to develop formulas for either one in isolation without considering the other one. I call this a backdoor to the Unified Valuation System (UVS). It's by necessity. The committee intends to have something in place

by the end of 2002. This committee's also supposed to cover all equity-based products, not just variable annuities and living benefits.

The RBC model is consistent with the reserve model. A lot of the same people were working on it. The RBC basis will be a stochastic analysis with the same calibration points. Right now, we're focusing on a 90<sup>th</sup> percentile Conditional Tail Expectation (CTE) that is the average of the worst 10 percent of the results—the greatest present value (GPV) of negative surplus. That's an important point. It's not based on cash flows; it's based on surplus that is a much stronger requirement. That's the same as all the other RBC, except, in this case, it has a much greater effect because of the volatility of the reserve calculation. We suspect that, eventually, there will be some credit for hedging, and there almost certainly will be direct recognition of reinsurance cash flows in the analysis.

**MR. MUELLER:** Next we have Rodney Clark with S&P. Rodney is the director of financial services in Standard and Poor's Credit Market Services Unit in New York. He's got primary responsibility for the individual life and life reinsurance sectors there. Prior to joining S&P, his background included financial modeling, ALM, and pricing for traditional and variable products. He's got a degree from the Wharton School with a concentration in finance and actuarial science. He's also a Fellow of the Society.

**MR. RODNEY A. CLARK:** I'm going to talk about S&P's views on the risks associated with variable annuity guaranteed living benefits, the risk management procedures that are in place, and how that factors into the ratings. This is very much an evolving process. As much as the industry's still sorting what to do with reserves and what to do with RBC requirements for these products, we are still sorting out a bit of that ourselves. So everything I'm telling you is part of an evolution and is not the final chapter on the subject.

As with everything, we're not looking at any of the risks that we assess at S&P in a vacuum, but we're trying to take a holistic approach at how variable-annuity guarantees are impacting the overall risk profile of the company. Then on the other side with regard to the risk the company has taken on, we're looking at how effectively the company is managing the risk that it has. So my comments are going to be a little bit broader than the subject matter, just inasmuch as we're broader in our viewpoint of trying to tie this benefit in with other aspects of the company's risk profile.

Our approach, certainly, involves both quantitative and qualitative aspects. I'm going to start with the quantitative side. We have three quantitative measures that we're looking at in assessing a company's risk here: A capital adequacy model, which is statutory-based or solvency-based; a liquidity model, which is more cash flow-based; and a GAAP-based earnings adequacy model. S&P's capital-adequacy model is reasonably similar to the NAIC's RBC model. There are some differences in approach and a number of differences in the level of charges that we choose to

assess, but the basic form is reasonably similar. Discussing an example of the charges as they relate to variable annuity guarantees will give you an idea for the specific areas that the S&P model differs from the NAIC's approach. In neither model was there a charge for C-1 risk. On the C-2 side, S&P assesses a charge that the NAIC does not, which is anywhere from six to 25 basis points on the entire separate account liability. That includes variable life products, guaranteed, non-guaranteed, et cetera. The feeling here was that there is, perhaps, a risk that the NAIC model does not capture with regard to general pricing risk—risk that the cost of insurance (COI) charges are inadequate, mortality and expense (M&E) fees are inadequate, et cetera. The six to 25 basis point charge varies with the size of a company's separate account asset pool.

On the C-3 side, S&P doesn't currently have a charge. As Frank just talked about, the NAIC has this sort of placeholder charge of 1 to 3 percent on the guaranteed living benefit reserve today. It will really be revised in a couple of years. We are looking at what the NAIC is doing and trying to sort something out here ourselves. We plan to charge something going forward, but are waiting to see where the industry goes. There is an extent to which we prefer to use a stochastic method in favor of a deterministic method, but we found that sometimes less is more. The more that you ask a company for, the less you're going to get. If we put too rigorous of an approach into place, the reality is we're not going to get good data or we may not get any data at all. So probably, wherever we end up with a C-3 charge for this sort of benefit is going to mirror the NAIC's approach or be some other sort of deterministic approach. That's the likely outcome.

Finally, on the C-4 side, both the NAIC and the S&P models have a five basis-point charge on the separate account liability. We're also charging 2 percent on the premium and that has a sort of odd evolution—simply that we had a 2-percent premium charge in place before the NAIC model had any C-4 charge on separate accounts. We added the new charge without taking away the old charge, essentially to leave a placeholder because we're not capturing certain benefits right now, including the guaranteed living benefit risk. So the 2 percent of premium on the separate accounts can be viewed as a placeholder that's probably going to go away in a year or two as we evolve our approach on some of these other guarantees and make that more specific to the level of guarantee involved.

In terms of liquidity, that has less application to variable annuity guaranteed living benefits, except inasmuch as it gets to the point that the benefits are actually being exercised. There is some cash outflow on these benefits that we really don't see much of today. We take a look at a company's asset portfolio, make some haircuts based on our assessment of the liquidity of different types of assets, and the ability to monetize certain assets to cover a company's cash outflow needs in terms of surrender risk, annuity payouts, debt-servicing costs, et cetera. This doesn't apply to separate account products that are, generally, mark-to-market and have market value resets to the liability side. It could affect the variable annuity GMIBs, for

example, down the road, as these options become exercisable. That potentially becomes a charge to the general account asset portfolio of a company.

On the earnings side, we have an earnings adequacy model that we use at S&P that attempts to compare a company's overall earnings to a set of benchmarks that vary by product. For most health products they're return-on-revenue-based. For most life and annuity products they're return-on-asset-based. All of the charges in that model are an attempt to define an appropriate minimum risk-adjusted rate of return for the various products. For variable-annuity products, regardless of guarantee, the benchmark we have in our model is 14 basis points on the VA reserve. That being sort of the minimum for BBB-level earnings. AA-level earnings would be about twice that, about 30 basis points. There is a possibility we could expand that at some point to incorporate more diversity, based on the risk associated with products, but that's how it stands right now.

The reason we're looking at this is to catch problems before they occur. If you look at a company's earnings relative to some benchmark for a minimum risk-adjusted level of earnings, hopefully you can find the companies that aren't earning an adequate return before they become losses. With regard to these types of benefits, hopefully you're going to catch the inadequacy of earnings before a company actually is in a money-losing situation. Because when we assess the financial strength of a company, we're trying to be prospective and to catch problems before they actually occur.

On the qualitative side we're looking at a number of elements, such as a company's risk tolerance, risk mitigation, and risk management. How much risk are they taking on? What kinds of things is a company doing to mitigate the risk that it has taken on? What approaches is a company using to manage the risk that's inherent in its assets and its liabilities?

In terms of looking at the risk tolerance side of things, we need to look at the type of guarantee a company is offering. GMDBs are probably the least risky among these. Depending on the nature of guaranteed accumulation benefits or income benefits; one or the other might be the highest risk, depending on the actual structure of the benefit. We certainly look at the type and level of guarantee, including return of premiums, various percent roll-ups, ratchets, resets, and so forth in assessing the company's tolerance for higher levels of risk embedded in their products.

You can't look at any of these in a vacuum, however. We have to look at what the market is requiring in terms of these benefits. With GMDBs, a return a premium is pretty much mandatory in the marketplace. Ratchet-type benefits are a bit less common, particularly in career agent companies or more traditional companies. When you get out in the brokerage market and some other more competitive environments, some of the more aggressive guarantees are necessary in order to play in the market. Enhanced earnings benefits or enhanced death benefits are

gaining some momentum in the market. GMABs are still very uncommon. The minimum income benefits are becoming a little more common. We look less favorably on a company that's adding bells and whistles that the market isn't demanding and are a bit more tolerant when they're adding things that the market really does require. In the end, what we're looking for most is how a company is competing in order to sell its product. We tend to look negatively on a company that's competing by adding risky product features versus a company that competes by adding value-added services.

We talk about competitive advantage a lot in assessing the ratings of companies. It may not have an obvious application here, but it relates to the previous point about competing through value-added services as opposed to through higher-risk guarantees and so forth. When we talk about competitive advantage we're really talking about two things. Either a company is more efficient than its competitors and, therefore, for the same level of risk in a product and the same price it can earn more profit, or a company has products and services that are perceived to be higher-value and therefore can charge a higher price for a similar risk and in the end produce more earnings. More earnings ultimately yields more capital which can be reinvested to produce a more competitive advantage. We find that companies with those sorts of characteristics are the companies that are more positioned to survive in the long run.

As a quick example on the efficiency side going outside of the insurance industry, you might look at Southwest Airlines that has a very efficient fleet, very efficient processes, and favorable labor contracts. Because of that it can earn more money than the major airlines with the same or even lower fares. On the flip side, you might look at an example like Intel that, because of the perceived value of its products, can charge more than its competitors for a similar product and make more money. Those are the types of things that we look upon very favorably in our assessments.

Relating that back to insurance, some of the particular things we look for in terms of competitive advantage are a company's distribution capabilities. Does it have a broad-based, well-respected field force, a particularly efficient field force, company service capabilities, or breadth of product offerings? That comes in into play in a couple of areas. A broad set of product offerings, certainly, can breed more loyalty among the field force and more loyalty among the customer base, which yields more profitability. It also provides a potential for more stable earnings and potential that if you have uncorrelated or even negatively correlated product offerings, it tends to mitigate risk. Investment performance may be a difficult area to establish competitive advantage, but it's arguable that some companies have. Of course, low cost structure is important. Product alone is rarely a competitive advantage. Pretty much anything that you can put out in the market somebody else can replicate awfully quickly and often times surpass you.



In terms of assessing risk management with these types of products, hedging and reinsurance were talked about quite a bit and those are the key things that we see. With regard to hedging, there are a couple of issues. First of all, you have to ask if the company has adequate expertise to put a hedging program into place. The reality is a company that hasn't had a lot of experience with equity market derivatives and hasn't had that as a key part of its investment strategy probably is not in a position to be hedging this risk itself. Those companies probably ought to be looking at reinsurance or at not offering the benefit at all.

Does the company have adequate scale? That's something that we debate a lot in terms of what is adequate scale. Probably, in terms of these kinds of benefits, it's better than a billion dollars of variable annuity assets which, obviously, takes time to build. Some companies really don't have the capacity to get there in the short-term. It may be well above a billion dollars to hedge this really efficiently. So we are a little bit less favorable toward smaller companies trying to implement hedging strategies just because of basis risk and the difficulty in the ability to put a program into place. Any hedging program is only as good as the assumptions that are behind it. Annuitization assumptions that are based on past history may not be a legitimate gauge of how these types of products are going to react when the options are in the money. I'm reminded of the example of term-to-100 in Canada, where the ultimate lapse rates that were developed were nothing like what was originally priced for because they were based on very different types of products. We tend to be a bit skeptical about hedging programs in these cases or at least very closely scrutinizing a company's assumptions.

The reinsurance side is a bit of a difficult issue, because in the early days with the minimum death benefits, a number of reinsurers came into the market and put a lot of business on the books very quickly and then left the market. They did this because nobody else was competing against them and they got more business than they felt comfortable with. A couple more companies have entered more recently, but we're certainly mindful of asking some questions about the reinsurance programs that are in place. Is it a high quality reinsurer? Is it a reinsurer that has good expertise in managing these types of products and these types of financial risks? But on top of that, what are the terms of the agreement? What's the duration of the agreement? Is all the tail risk covered?

In terms of incorporating that into the quantitative side, I might add that right now in our capital adequacy model, we pretty much only give credit for full proportional reinsurance, and that's not the dominant form that's in the market today. The dominant form is clearly the non-proportional form. That's something that we're also going to have to address in the future. For the near term we'll be addressing it on a case-by-case basis, in terms of giving any credit in terms of required capital for non-proportional reinsurance programs.

In the end, what's going to drive the rating? We find that financial strength improves if there's value added in a product that is adequately priced. Financial

strength can also improve if a product is producing stable, long-term revenue growth stemming from the product design or reinsurance. If a company can demonstrate competitive advantage, then it's not competing only on price, but it's competing with some sort of value added. Is the product capital self-sufficient at a strong level of capitalization? Is there a tight process of controls and risk management in place?

Financial strength suffers when a product is sold as a commodity, when a company's competing just on price, or on the level of its guarantees, or on the rates that it's crediting. When cash flow and asset persistency are volatile, which an inadequate hedging program can cause, that leads to liquidity risk and earnings instability. This is also the result when a product consumes more capital than it produces, or it's thinly capitalized, or when a company has a high tolerance for risk or poor control mechanisms. Finally, all of our rating criteria related to this and any of the other issues is available on our Web site. So if you want to see the articles and more specifics about our capital model and the structure, feel free to refer to that.

**MR. LARRY GORSKI:** I'm with the Illinois Department of Insurance. I have two questions. The first one is for Hubert and maybe then a question for Rodney. Hubert, you identified the different kinds of risk that you felt were associated with this product. I think there may have been an omission there in that there was no identification of legal risk. I bring that up because, as companies become more active with the benefit, GMIBs in particular, I think there may be a need to really understand the nature of the benefit and the way that benefit is disclosed to policyholders and any legal risk associated with that.

For Rodney, in talking about reinsurance, you pointed out one of the criteria of being a high-quality reinsurer and why high quality is, obviously, important. One could still have a concentration of risk associated with a single reinsurer. I don't think anyone would invest all of his assets in a single AAA quality bond and probably that same thinking applies to reinsurance. I would think you don't want all your reinsurance with a single high-quality reinsurer. So does that fold into your analysis in any way?

**MR. MUELLER:** You're absolutely right, Larry. Legal risk ought to be on that list and it was probably omitted because it wasn't a comprehensive list. And I think there is an issue. In the October 2001 issue of Joe Belth's *Insurance Forum*, there was an article that said that some of the recent federal legislation that has been enacted will probably prevent misselling from being an issue for variable policies, at least at the state class action level. You could still have individual lawsuits from people who feel that they haven't been given enough adequate disclosure about some of the risks and what the guarantees are, but it does seem like some of the more recent federal legislation prevents state-based class action lawsuits by policyholders. So, in some way, and probably just by pure luck, companies issuing variable policies may be protected from class action lawsuits. Nevertheless, I think

as a company you still have a moral and a general obligation to your policyholders to make sure that they're adequately informed about the features in the contract and some of the volatility and the benefits. So I agree that is a risk that needs to be on there.

**MR. CLARK:** The legal risk is certainly on our radar screen. And we've heard some things about some more deceptive product designs in which guaranteed annuity purchase rates at the end of a contract are particularly unfavorable and may not be fully disclosed to policyholders. Honestly, the thing that's more on our radar screen right now is bonus annuities in terms of disclosure there. But all of these areas are risks that we're paying attention to.

Reinsurer concentration is absolutely a risk. And, unfortunately, there aren't a lot of reinsurers writing this particular type of business right now. But the breadth of the portfolio of reinsurers in a company is positively something that we're looking at. I think quality, first, but concentration, second, and we look at it on both sides. With regard to some of the smaller reinsurers that are writing some coverage like this, what is their ceding company concentration as well?

**MR. CLAPPER:** Believe it or not, I'm against reinsurer concentration risk. And I would say with regard to legal risk, you do hear some sad stories when you talk about annuitization assumptions. I've had actuaries tell me that they don't know what they're getting anyway. And that bothers me a little bit, because it leads to disagreement about what the annuitization assumption should be, so it's not easy.

**MR. DAVE INGRAM:** I have a question for Frank. You gave the disadvantages of hedging, and I have a two-part question related to that. The first question is doesn't somebody have to, ultimately, hedge the risks?

**MR. CLAPPER:** I think I was talking about ceding company hedging.

**MR. INGRAM:** Right. I'm looking down the road and saying, well, if you reinsure the risk doesn't the reinsurer, or somebody that gets the risk, at some point in time have to hedge it?

**MR. CLAPPER:** Well, you have to manage the risk somehow, but at an aggregate level and it will probably involve hedging, yes.

**MR. INGRAM:** The second half of my question is of the four disadvantages you had, which of them are ones that the reinsurer has some better way of taking care of than the direct company?

**MR. CLAPPER:** One is the scale, obviously. And the basis risk, itself, gets smoothed over if you've got more of a breadbasket of securities instead of just one product. A lot of the disadvantages are softened if you develop a broad portfolio. Certainly the insurance assumptions would be easier to determine if you've got a

big portfolio. It's like any other insurance product. The more data you have, the easier it is to do. The duration is not such an easy answer, because there you get into dynamic hedging, so you need a more sophisticated way of handling it. The point is that you're not going to find fixed options to cover this risk so you need to do a more sophisticated hedging strategy which involves all of the durations up the line, and not just the one duration at the end of the line.

**MR. MUELLER:** If I can just add to that point on hedging, a smaller company may not have the experience and the economies of scale to execute a full-scale hedging program. I would also warn not to jump into hedging right away and perform transactions in the marketplace before you've done adequate mock testing. Test the different strategies. You should formulate your own risk tolerances and constraints and figure out which of those strategies would work well for you. There's a tendency for people to be over-conservative in how they first design hedging strategies, which would lead to a number of trades. Hedging is not free, so it is going to cost you something. You're cutting off your tail and you're lifting up the tail end of your results. But on a present value basis, there is a cost for hedging. There's no free lunch.

**MR. CLAPPER:** There's a presumption in a lot of places that the only way to manage this risk is through hedging, and that's simply not true. For example, if you have a large property and casualty (P&C) reinsurer, this risk is, generally, uncorrelated with the P&C catastrophe risk. The World Trade Center being an exception, but that's part of the mechanism that's used to diversify the risk. And you also can spread it around with different companies and different markets.

**MR. ALLAN BRENDER:** I'm with the OSFI in Canada. I have some remarks. In particular, I wanted to say a little bit about the relationship between risk management and capital. Hubert mentioned our supervisory framework, and one of the things to point out is that we supervise banks as well as insurance companies. A lot of risk management has been developed in the business world through the banking regulation, and through the Basel Accord, and is coming to the banking culture that way. It definitely affects the way we look at supervising everybody, including insurance companies.

What their supervisory framework says is that we will look at a company's raw risk, look at its mitigational affects, and its risk management and come up with a kind of assessment of its net risk, and try and come up with an elaborate scoring method to measure different areas of its net risk. That scoring method is now in a beta testing kind of mode. We come up with a score and then we say the degree of supervision that we put onto the company is a function of the score. The better a company is, the less we bother it.

We regard risk management as the first line defense as far as company solvency is concerned. Risk management is about avoiding problems. If you break through that dike you have problems if you need capital. We'd far more favor having a strong

first line of defense and capital as a fallback position. If you look at the Basel Accord, for example, that shows up because there are places in the original Accord where banks have market risks because they have blocks of assets that they trade for their own account for profit and they have to put up some capital for that. The Basel Accord has a formula that says there are certain factors you should match against measures of the assets you hold, and you can do a calculation and come up with it. But it also offers the banks the opportunity to use internal models—value-at-risk kinds of stuff to do their own calculations. The assumption is that if you're doing your own internal modeling, you're going to produce a lower capital requirement because you get something that's tailored to the company and to the portfolio instead of factors that are industry wide.

The regulator is willing to live with that on the banking side because it puts all kinds of requirements on for additional risk management activities around the trading book. In particular, it has a lot to say about how the models that are used are constructed, and there's a lot of control. The banks can't change the models unless they, in fact, come back to us and say we want to look at them. We have capital rocket scientist types who look at this stuff, the value of the models, and all the risk-management stuff.

When it comes to segregated funds or variable annuities, we're very much influenced by that. We've created capital requirements that are based upon factors. We've just recalculated them and sort of cleaned them up, again. We expect these are going to last, hopefully, forever, but companies will have the opportunity to do a lot of stochastic testing on their own internal models. The price for doing that is that we approve the models and that we know all about the risk management. The company and the board are aware of all the risk-management activity. There's a lot of risk management reporting to the company. The people involved are qualified people and all those kinds of things that you naturally would expect. Those are the conditions that are built around it.

Hedging is exactly the same thing. In particular, we want to know that the hedging works. So there's no credit for hedging unless they can show us that they have a hedging program in effect and in practice for at least three months. We have a very well-known finance professor as a consultant and we don't do anything unless he's satisfied the hedging policy makes sense.

I just want to say one thing about hedging. Generally speaking, we're talking about guarantees of at least 10 years. A lot of people assume you can't buy hedges for that kind of period, so the assumption seems to be you're immediately into dynamic hedging, which becomes very expensive. If you've embarked in a real-life scenario in which you're leading to disaster, the cost of the hedge is going to start approaching the cost of honoring the guarantee. So we have at least one major company that has, basically, decided it's not worth it. It's too expensive. It's not going to pay off. So, basically, they're saying their strategy is to go naked. Reinsurance doesn't seem to be an issue because there's very little reinsurance

available for this stuff in Canada. So when it comes to who bears the hedge, sometimes that's going to be the position, but they bear the risk.

**MR. MUELLER:** That's correct, but it's obviously easier for a large company to make that kind of a statement, and to bear a capital hit on a portion of the portfolio, than a company that's exclusively in that marketplace. So it's obviously a question of what position you're in.

**MR. DEREK G. FERGUSON:** Why have so few reinsurers come into the market given the recent withdrawal of the old guard? I'm assuming they were making lots of money on this. Why has there not been a flood of reinsurers to come in with new capacity?

**MR. CLAPPER:** The biggest thing is that it takes development of a big operation and expertise to support this product. You can't just do a deal in a week or two . You've got to set up a whole operation and you've got to assemble a team of people who can analyze it, administer it, and value it. As I said before, that's part of your management process. There are not a lot of large reinsurers in the life business anymore so I don't think a lot of the smaller reinsurers would be interested in doing this. You've got to have the large capacity to assume risk and you need good support for that. You need a large operation to handle the products, so there's a lot of momentum involved. In other words, you can't just suddenly decide to get involved in the market.

**MR. CLARK:** I might just add that an awful lot of reinsurers develop products for this type of market, but found that nobody wanted to pay the price that they were charging for it. Some companies felt that at the market prices they couldn't receive an adequate return and that's why they dropped out very quickly.

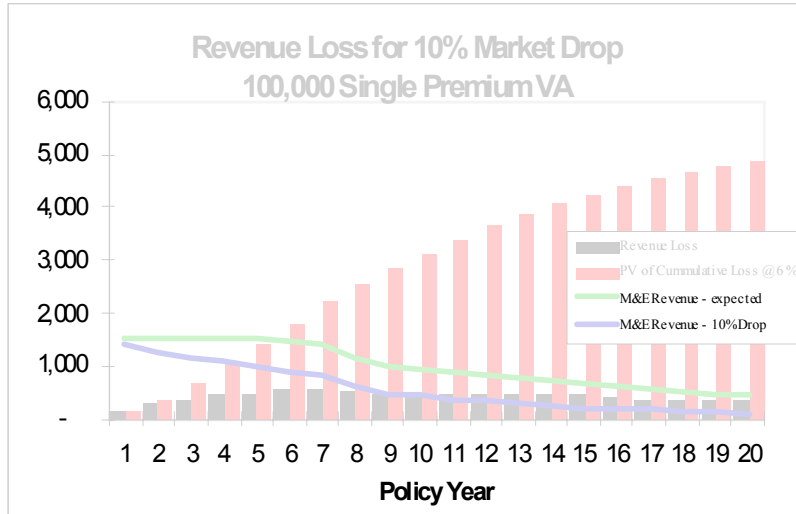
**MR. CLAPPER:** If you're not willing to buy reinsurance at that price, keep in mind that the basis for that price is the price in the financial markets.

**MR. MUELLER:** I would agree with both of the statements. Clearly, reinsurance was available at very inexpensive rates through a long period of time and companies in the market got spoiled by saying we can easily price this into the product, maybe at a small margin, and maybe even make a profit on the future and reinsure out all the risk. That's not in there. That's not happening anymore. That's not just in North America. That's true all over the world. Nobody's giving you a free lunch these days, so you've got to be prepared to bear the hits if you don't want to reinsure. And if you're looking for reinsurance, it's hard to put that in on the existing product which you probably priced three, four, or five years ago. It means you have to reprice your product. But I would think that as we go forward in the marketplace, the current period will be a period in which more companies will be looking to re-price their products and probably put more adequate costs and loads into the product, compared to what they have to pay for reinsurance. Going

forward, there will always be a market for reinsurance in addition to other risk-management solutions.

Chart 1

Revenue Loss Example



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Chart 2

GMIB - Revenue and Benefits

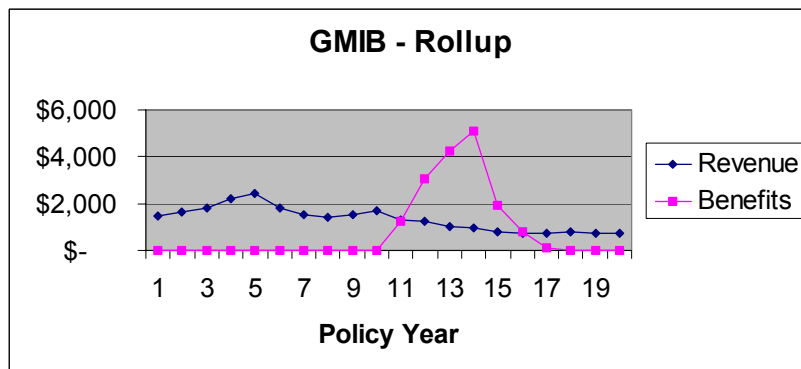
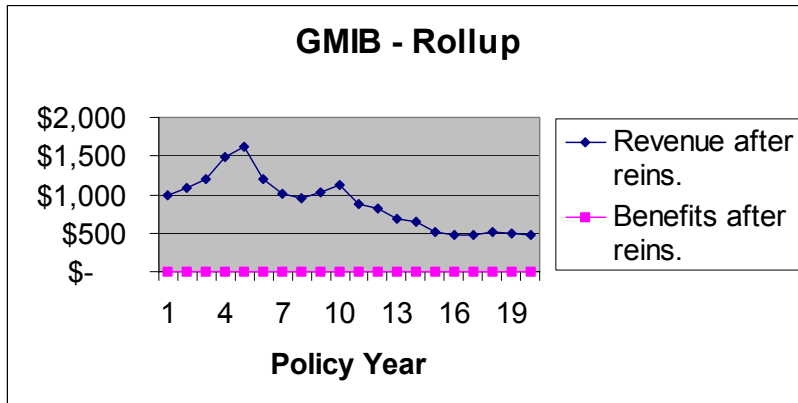




Chart 3

## GMIB - Revenue and Benefits AFTER REINSURANCE

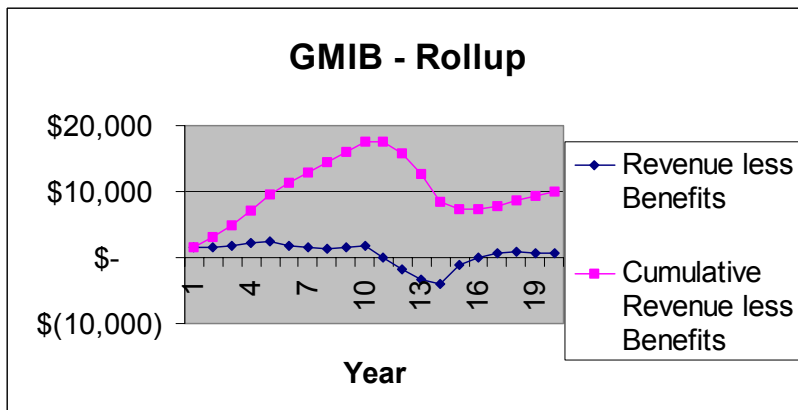


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Chart 4

## GMIB - Revenue less Benefits



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Chart 5

# GMIB - Revenue less Benefits AFTER REINSURANCE

