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Session 31PD
Equity Products in Difficult Times

Track: Product Development

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Panelists: NOEL HENDERSON HAREWOOD
FRANCIS SABATINI

Summary: Many challenges face the issuers of variable products in today's market. Equity markets and variable-product revenues have dropped sharply over the last two years. Variable-annuity, guaranteed-living benefits and variable-life secondary guarantees have brought new risk to insurers. Reinsurance for derivative benefits is scarce and expensive, and internal hedging is difficult. Participants gain an understanding of the challenges and sources of risk inherent in managing a variable product portfolio and an appreciation of possible actions that can be taken to achieve growth and profitability in difficult economic environments.

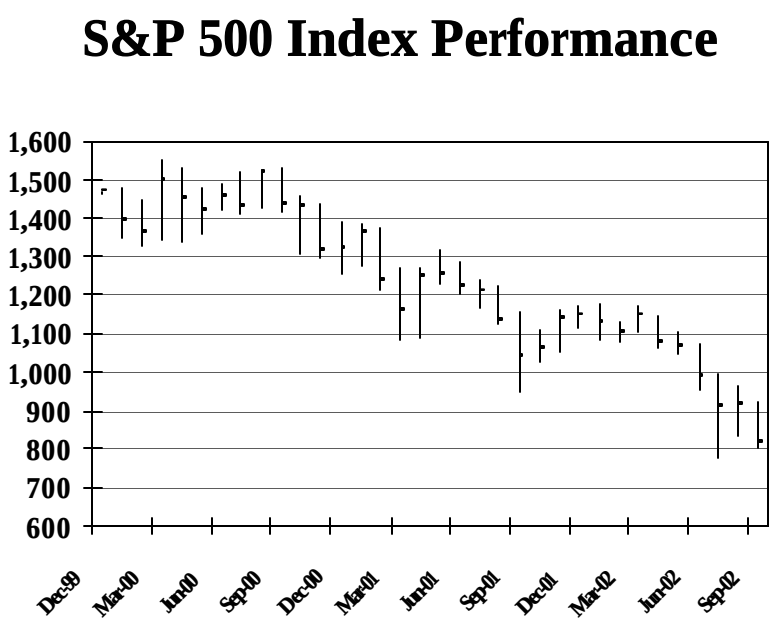
MR. ROBERT LEACH: I work at Manulife Financial, which is headquartered in Boston. I'm going to spend a few minutes talking about my company's experience in difficult times, particularly in the difficult equity markets of the past three years. The other two panelists are distinguished individuals who are going to give you some insight into ways to better manage equity-risk exposure.

Noel Harewood is a consultant for Tillinghast-Towers Perrin. He has a lot of experience in the variable-annuity market including product development and financial reporting. Noel is going to talk about managing equity risk through product design, which I think is a very interesting topic and way of thinking about whether you can hedge your own risk.

Following Noel is Mr. Franck Sabatini, from Ernst & Young. He has developed a particular expertise in hedging for capital-market risks, and I think Frank will have some very interesting remarks to make.

So with that, let us move on to the agenda. Figure 1 probably does not need any introduction to any of you here in this room. This is what has happened to the stock market in the last 33 months. The S&P 500 dropped. At the end of 1999, it was at 1469. As of the end of September 2002 it was at 815. That's a 45 percent drop over 33 months. There has been a slight recovery in the last few weeks. The S&P closed this past Friday at 898, but it is still down 39 percent for the period since the end of 1999. So clearly, these are the conditions under which the variable-annuity and variable-life-insurance-type products are going to be at maximum stress, so the timing of this session probably could not be better.

Figure 1



With that, I'm just going to make a few remarks about my company, Manulife, and what we've seen in the last three years. First of all, everyone has noticed a decrease in variable-annuity sales, and Manulife is no different from the rest of the industry. We peaked at about $4.4 billion in sales in 2000, and dropped off by about 16 percent, to $3.7 billion, in 2001. Despite that, sales remain in a range of $3.5 billion to $4 billion or so. Even though sales are still coming in, the other side of this story is that the assets under management (AUM) have not really been growing. They have been remaining fairly steady, and the obvious reason for that is because the sales are coming in, but they are being completely offset by a market drop. In the old days of actuarial modeling you could make an assumption that your AUM would grow by the gross amount of sales and that the withdrawals would more or less offset the investment growth. That clearly has not been the case in the last three years.

The figure that I just showed you presents a number of problems. First of all, you

have declining revenue from the maintenance and expense (M&E) charges in your annuity products. Secondly, and related to that, to the extent that you have advisory-fee sharing through your variable sub-accounts and you have the 12b-1 fees coming off your variable sub-accounts, they are also under pressure (12b-1 is a reg-governing fee for promotion, distribution and marketing). Combined, these two factors put pressure on your overall fee income, placing a fair amount of pressure on deferred-acquisition costs (DAC). Your ability to recover your fixed up-front cost may be coming into question under these conditions. The more obvious risk that people probably spend more time talking about is guaranteed minimum death benefit (GMDB) exposure. Clearly, that has gone up dramatically, and that is a highly leveraged exposure. It is a near-term exposure, so it deserves a lot of attention. If you're in the guaranteed minimum income benefit (GMIB) market, you've also experienced some pressure from these markets in terms of how you're going to manage the increase in those costs and potential reserves. One good thing about GMIBs is that they are not as quite as near-term in their timeframe. They have more of a 10-year timeframe as opposed to a GMDB.

At Manulife we have used alternative solutions, such as product-design changes. Making your basic GMDB more conservative is the topic that Mr. Harewood is going to get into. Three or four years ago, the variable-annuity market was such that you had a five percent roll-up or some sort of an annual ratchet-death benefit as your standard product feature. Since then, many companies have gone to rolling out products for which the basic death benefit is much more of a plain-vanilla return of premium. A "guaranteed-earnings multiplier" is our company's name for what people in the industry generally refer to as an "earnings-enhancement death benefit," which is the tax-driven death benefit. There is an advantage here in product design, because it gives you a natural hedge against other things that are going on in your portfolio.

Now I'll address changes in GMIB design. I think the first GMIBs that hit the market three or four years ago had a seven-year waiting period. Virtually everybody that offers these benefits now has gone to more of a 10-year waiting period. They have increased prices, and they have done other things to make the product design more conservative.

There has been a move toward products that have less loading on the front end. C-share products have been around for a while, but more recently, the L-share products have come on the scene. These are products that pay a reasonable up-front commission, but not as much as some of the more traditional annuity products. Instead, they transfer some of the compensation risk to the broker in the form of a tail.

Finally, it has become noticeably more difficult to get reinsurance for death-benefit risks and minimum-income-benefit risks.

In this environment, we are in the market with four major products: a C-share

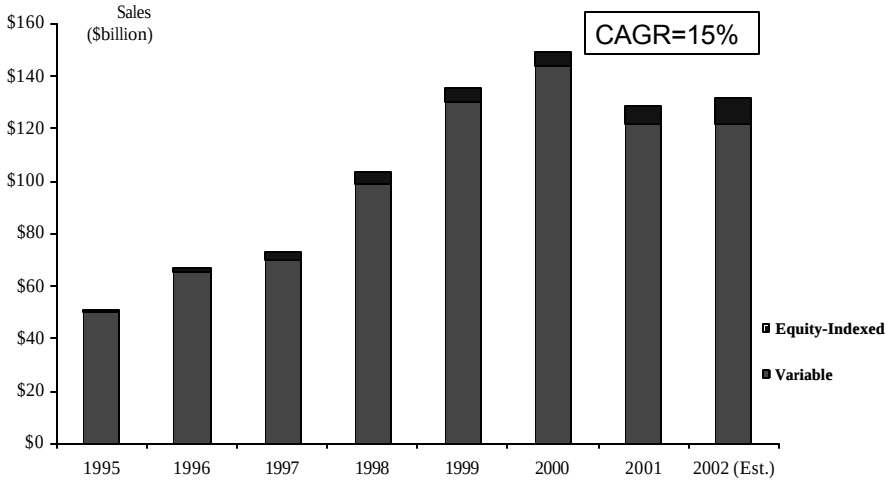
product, an L-share product, a seven-year product and a bonus product. The good news is that we're selling about 45 percent of our business between the C-share and the L- share products, which have the lower front-end investment and lower DAC. The bonus product is one that reveals a double dip when you're talking about the types of issues that we face in these markets because not only are you paying a broker commission, you are also paying a bonus to the client. All of that is front-end cost. With your fee structure under pressure, your ability to get that back may be something that you need to think about.

MR. NOEL HENDERSON HAREWOOD: Basically, I am going to give a brief overview of what we mean by equity-based products. Then, I am going to discuss the impact of volatility on the result of these products. And finally, I am going to talk about the product-design changes that we have seen that may or may not help the situation, as the case may be.

When we talk about equity products, we are talking about two basic kinds of products: variable annuities and equity-index products. The variable product is a separate account-driven product and are registered and governed by the SEC/NASD rules. Equity-index products such as equity-indexed annuities (EIAs) and equity-indexed universal life (EIULs) are general-account-type products, have various indexing methods and are not governed by the SEC. I am going to focus on variable annuities, because that is still the lion's share of the exposure that companies have. Figure 2 shows that sales of equity-related products have grown significantly from 1995 to 2000—maybe a 20 percent growth. It has come down a bit since then, and we all know why.

Figure 2

Sales of equity-related products have grown significantly since 1995



Annuity sales only.Source: Tillinghast - Towers Perrin, The Advantage Group

The next central question is, "What do we really mean by risk?" Risk means different things to different people. For the purposes of this presentation I'm defining risk as an adverse outcome, separate and distinct from a wide dispersion of results. We're saying that risk has two basic components: a frequency component and severity component. Possible measures would be standard deviation, percentiles and conditional-tail expectation (CTE).

I want to make sure that people are aware of the other kinds of risks that we are talking about. Operational risk involves the basic company risk in producing transactions. There is also legal risk in the product, which could be getting more interesting now that we have the patent issues coming up. You also have the insurance risk, which is your generic C-2-type of risk in terms of mortality and lapse. The idea is, of course, that the benefits most people are focusing on are actually compound events. The GMDB only becomes a factor if people die, which is a mortality issue, and then their guarantee is in the money. So we want to make sure that we keep an eye on that as well.

Most of what I am going to be talking about today will be equity-market risk. Let's start by looking at generic variable annuities. We are going to start out with a standard B-share. We are going to charge a standard 140 basis points. We have the standard seven-year declining surrender charge and 10 percent free partial withdrawals are available. There are no guarantees. This is the plain-vanilla, original variable annuity from the early '90s. I am going to try to plug in some standard industry assumptions. I picked an issue age of 64, because it is a nice cubic number. A $50,000 deposit is pretty close to the industry average these days. There is a seven percent front-end commission with no tail and 1.4 percent on sales or marketing. These are fairly basic assumptions.

We are going to assume that it is all a separate account, which frankly these days I think that we are seeing more money in the general account now than we have in quite a while. For our purposes we're going to assume that target surplus is 80 basis points of reserve. Advisory fee are 75 basis points and it has an average fund reimbursement of 20 basis points. On a deterministic basis, we are getting a nine percent rate, a return on investment (ROI) of 14.5 percent, a new-business value at nine percent or 545 on $50,000 or 1.09 percent of premium. It is a solid product. There are nice profits for everybody.

Now we're going to take this product and plug it in to a stochastic analysis. Five hundred scenarios were generated using my company's proprietary scenario generator. The parameters we will use in our scenario generation are 9.2 percent mean annual return, with 17.4 percent volatility. This is based on June 30 capital-market conditions. We are going to look at the distribution of the value of the new business that we get. We're always keeping the two components in mind. The frequency is the number of failing scenarios, where the value in business is less than zero or nine percent. We are also looking at the severity in our tail. How much money can we really lose doing this kind of thing?

Figure 3 graphs the results. We can see that this base product is actually pretty risky. About 20 percent of our scenarios are failing, and this is without any kind of guarantee at all. This is purely M&E shortfall risk. Figure 4 shows the results in table form. We want to focus on the number of failing scenarios; 109 out of 500 scenarios are actually giving you a value of new business that's less than zero. The point that we want to make is that the base product, without guarantees, is actually a very risky product. People who are writing this business can lose money fairly easily—five percent, without even considering your GMDB or GMIB exposure.

Figure 3

Base product is actually quite risky!

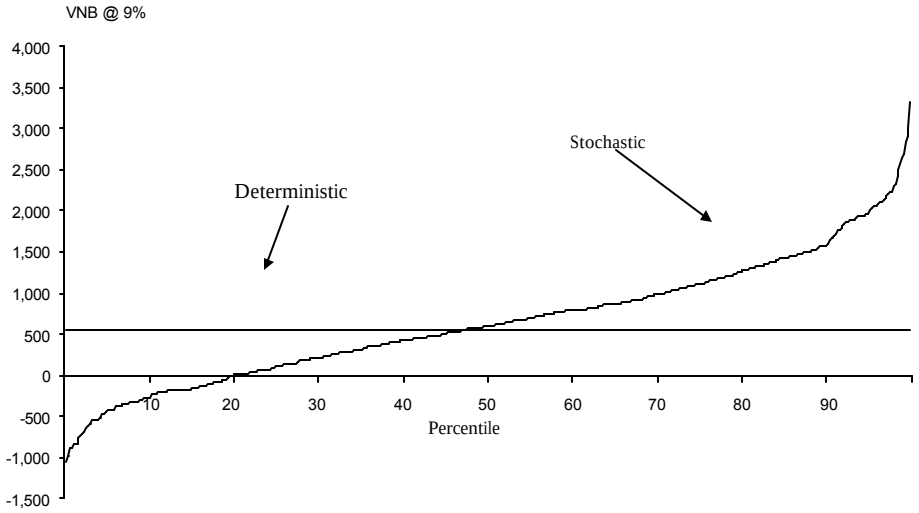


Figure 4

Stochastic results show significant risk to base product (without any guarantees)

	Base
Mean	1.24%
Standard Deviation	1.49
Median	1.13
95th percentile	-0.91
99th percentile	-1.72
Number failing	109

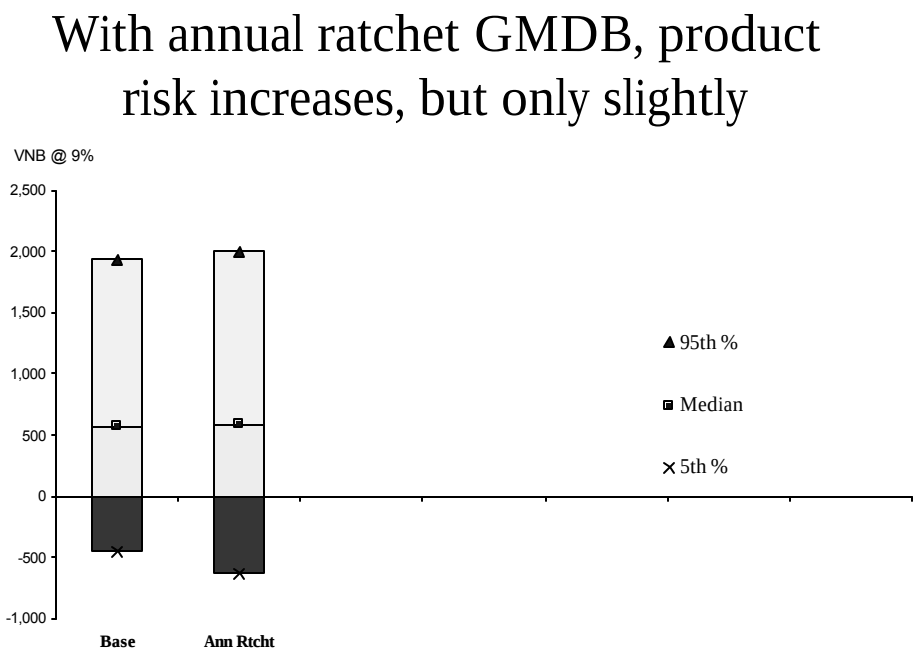
Now let's talk about guarantees. I am going to focus on GMDBs, because they are still the most common guarantees. We have seen some increases in the so-called living benefits, such as GMIB/GMAB, but GMDBs are still, I think, what everybody is tossing and turning about at night. At present, we know that, GMDB is on a large portion of industry contracts in force, though it varies quite a bit from company to company. Some companies have bundled their GMDB into their base product, so 100 percent of their products have some type of GMDB-based exposure other than return of premium.

The common approach now is to give a very basic GMDB and return of premium. Then you can have your ratchet, your roll up or your combination for various charges as options.

Increasingly, companies are charging a separate asset charge for the GMDB, which is in addition to the M&E. That, again, is a little different from what we saw three or four years ago when people would actually have the GMDB built into the base product. You would have one combined bundled M&E charge.

We are going to take our base product, add a GMDB and an annual ratchet and then charge 15 basis points for it. The thing I want to make sure we emphasize is that we have not made an initial provision for the Actuarial Guideline 34 reserves, but I think that you can understand the additional "haircut" on these results if we had put that in there. Figure 5 shows the results.

Figure 5

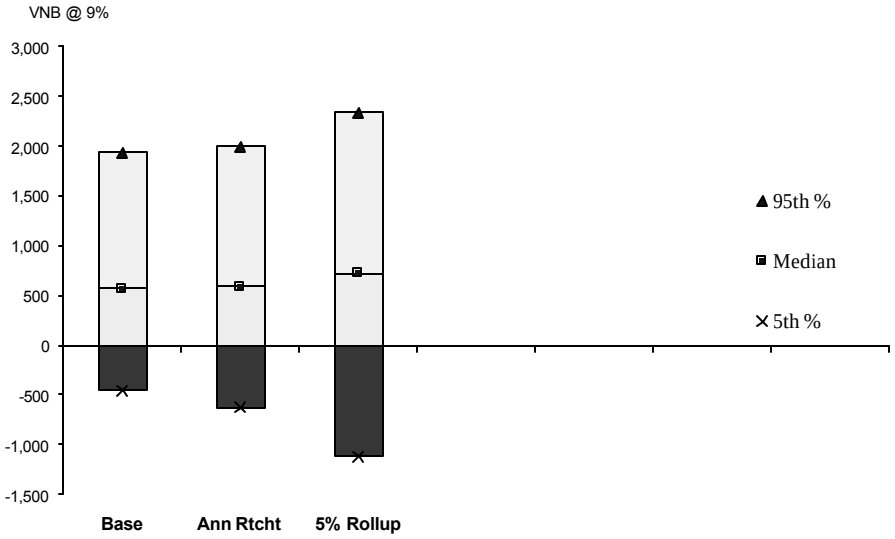


Basically, you can see that the annual ratchet increases the severity of the tail. There is about a 25 percent increase in the 95th percentile in severity. The number failing, however, does not increase that much. This should not surprise you because all the GMDB is doing is stretching the tail out. We are going to keep that in mind as we make our GMDBs more complex.

We can add a roll-up. Five percent is the most common roll-up number that we see. The roll up can be four to seven percent, depending on the company. A 15 basis-point charge is the same as the ratchet. Figure 6 shows that this is much worse.

Figure 6

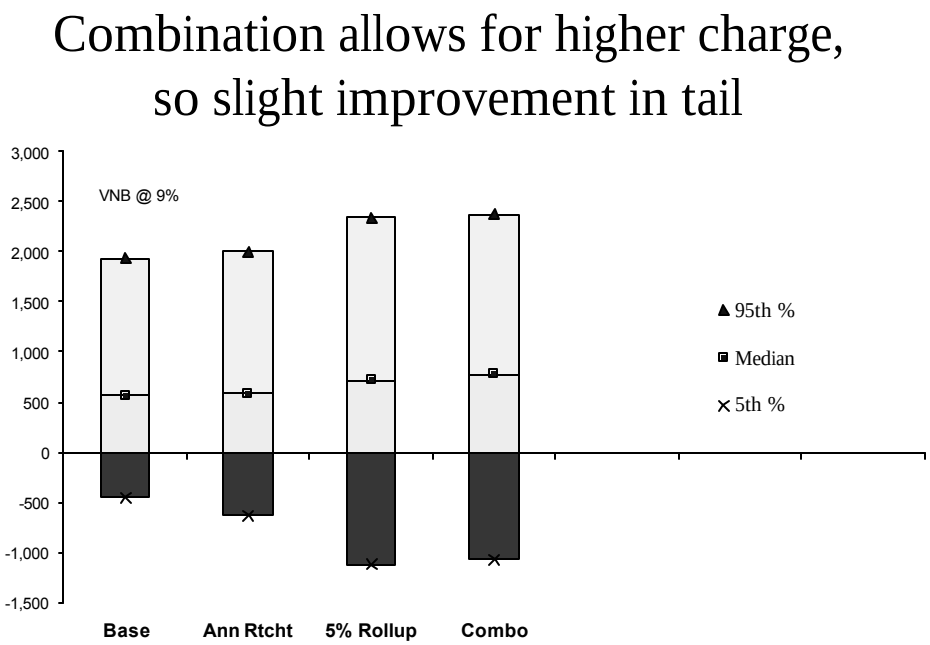
Even greater risk than with annual ratchet (but also greater reward)



We want to emphasize that the ratchet and roll-up perform differently under different scenario sets. As to which one is actually the more dangerous of the two, the difference is a function of this particular scenario set and a lot of it depends on what your assumptions are and where you start. In this particular scenario set, the roll up adds quite a bit to the tail severity.

Most products offer combination GMDBs, which is roll up plus a ratchet. Normally we charge a little more, but not double, for obvious reasons. We're going to use 20 basis points in the combination again, and as we said, maybe they will be built in, but more typically, you'll see a menu approach to the GMDB. Figure 7 shows the results.

Figure 7

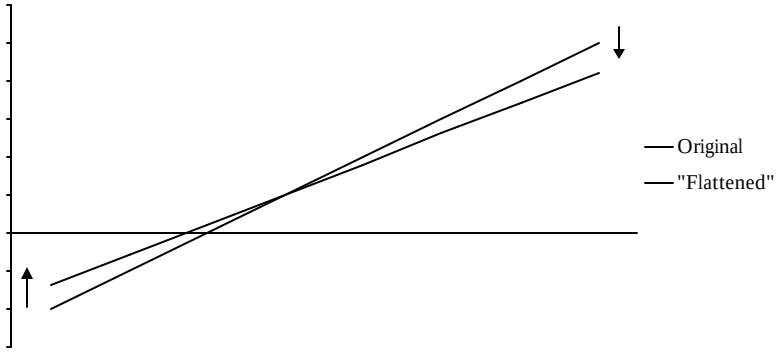


Let me go back and compare the base to the combination roll up. There is quite a bit of extra risk in offering a GMDB. The severity percentiles would double at the 95th and 99th percentiles. From a product perspective, there are a couple of things that we can do. We have two basic ideas—we can either flatten the curve or we can try to shift the curve to transform it upward. What do we mean by that? To flatten the curve means reducing the impact of volatility by reducing the severity of the adverse outcomes (Figure 8).

Figure 8

Flattening the curve - reducing severity

- Idea is to reduce impact of volatility by reducing *severity* of adverse outcomes
  - typically, will reduce volatility, limit upside as well



We have our initial curve, and we are going to transform it slightly by thinking of a seesaw. From our perspective, we are going to decrease the severity of the tails. Normally, this also has the effect of decreasing the upside. So our tails will not be as bad, but we are giving up some upside in return. This is what you will normally see in a hedging situation.

The other idea is to shift the whole curve upwards. The idea being that we are going to reduce the frequency of these outcomes. Because of that, we will get an increase across the board. This is probably a more desirable outcome, but also quite a bit more difficult.

One thing that we can look at is alternative commission structures. We can reduce risk in this product in two ways. We are talking about reducing the initial cash outlay. One of the big problems is having the large, upfront outlay for the commission. You want to shift some of that off and defer it. We are going to shift a portion of the market risk to the distributor, and because the distributor is also going to be getting a trail based on the asset level, we are guaranteeing that our margin on the M&E charge is going to stay fairly constant as a percentage of the asset level.

Typically, these products will have higher M&E charges. We have C-share and L-share products. They are both still emerging right now. C-share and L-share are probably in the region of 30 percent of the market right now. L-share has not been strong for some carriers, so we should keep that in mind.

Current product reactions are flattening the curve, limiting the guarantees, adding EDBs, creating alternative commission structure, shifting the curve and increasing net revenue. So far, some companies have limited the scope of their GMDBs. We are talking about an attained-age limit or dollar limit. For example, the idea is that we can cap the age at which the GMDB remains active in terms of whether it's increasing or not. Another thing that we can do is say that the product will be limited to maybe 200 percent of the initial deposit. Capping it will give us a little bit of an effect in the tail, but it is really not that big of a deal. This again, is going to be a function of the average age that we're talking about. Capping at age 80, versus age 64, is only going to save you a little bit, maybe the last five years or so of growth. If we had used age 75 as our standard cell, you would probably see quite a bit more of an increase. That's something that you need to keep in mind. The second thing that we can do is add an EEDB. That is all the rage these days. An EEDB pays an additional amount that supposedly covers the tax on gain from the contract. Normally, we are talking about 40 percent of the gain on that. It's negatively correlated with the GMDB, so that makes it an ideal hedging instrument. We get the charge for it as well, so it is another 100 or so points in product charges.

The big issue with the EEDB is product penetration. It is less popular, probably because it is newer and it does not have the same degree of product penetration that the GMDB has. There is also a reduction of risk, but it is not as big as some people might have thought it would be.

Although it is valuable addition, it is not a perfect solution because the value of the offset depends on the penetration and, furthermore, because the offset benefit is only 40 percent of the gain, it is not a 1:1 with the GMDB. It does reduce risk, though, so it is definitely not a bad idea. Right now, we are seeing about one-third of the contracts having EEDBs, as well as GMDBs.

The third thing we can talk about is the sample C-share. We looked at commission levels at 100 basis points and some C-shares may have a slightly heaped commission—maybe two percent followed by one percent. We see a lot of variations of this in the market. All withdrawals have to be adjusted as well. There is no surrender charge on these products and the key thing here is that the experience is only now emerging. We're still trying to get a handle on what the lapse experience on these things is going to be.

For deterministic returns we saw an ROI of 14.3 percent, which is close to what our original return was. We get a drastically reduced dispersion of results. The other thing that we can do is try to increase the net revenue. We can try to improve fund reimbursement by negotiating with the sub-advisors. We can try to reduce maintenance expenses. Based on our last survey, a lot of companies are experiencing significant expense overruns, and that's definitely an area that you can work on. The third potential option involves additional product charges. Annual fees that typically have been waived may need to come back. Aside from fund

reimbursement, this is probably the most difficult option because a lot of it is hard to accomplish. With product charges, there's obviously a significant PR and sales hurdle. There is also management-expense reduction. If they were easy, everybody would do it. But based on increasing the fund reimbursement by about five basis points, we get a slight shift upward in our distribution, proving that it is definitely a way to go. But again, it still quite a bit riskier than the original base product.

MR. FRANK SABATINI: Hopefully, everybody knows what these products that focus on GMDB do. If you die, we pay you more money than you have in your account. So you win big, or at least your heirs do. For GMIB, if markets under-perform you have the right to select against the insurance company and exercise an option to buy a guaranteed-income benefit. The insurance company is betting that you don't know that you have this rich benefit when the markets are down.

For those of you that are writing the benefit and have produced some volume, you have four more years for the markets to recover before the first seven-year period comes in.

Guaranteed-minimum-accumulation benefits are a put option provided by the insurance company. Actually, these are very valuable benefits to the consumer, and I think that as a large part of our population moves toward distribution, in other words, retiring, all of these people are accumulating this money for a reason. Hopefully they will spend it one day or pass it on to their heirs. So eventually, people are going to start distributing it. These features and guarantees are particularly valuable to people in the distribution phase.

Let's talk about the risk-management process. I think that most of you are familiar with it, but I am going to try to keep with the theme today. One of the keys to risk management is developing information and taking action on that information. In terms of managing equity products in difficult times, I think for many of us, had we acted, there wouldn't be as many of us in this session today. We have let the markets play out and haven't taken the initiative. We need to create a solid strategy, policy and process. You need to understand your tolerance for risk. And frequently, it is up to those of us that are part of the risk-management process to help management understand what the trade-off is. If we do not do this, and the markets go down by 40 percent, we are going to have a big DAC write off. Do you want that? If the markets go down and we sell these guarantees, you are going to have dangerous claims patterns and potential reserve increases. In terms of communicating the type of information that might have led to more action we may have failed. So at the end of the day, the idea of doing the cost benefit, looking at the cost benefit, and helping people understand the tradeoff is probably the most important part of any risk-management process that you can establish.

The other speakers have discussed revenue risk and guaranteed-benefits risk, and there are not that many alternatives to mitigating revenue risk. You cannot buy

reinsurance to hedge against revenue risk, but there are alternatives and I think that we should begin looking at them with greater vigor. Some companies have implemented risk-management alternatives.

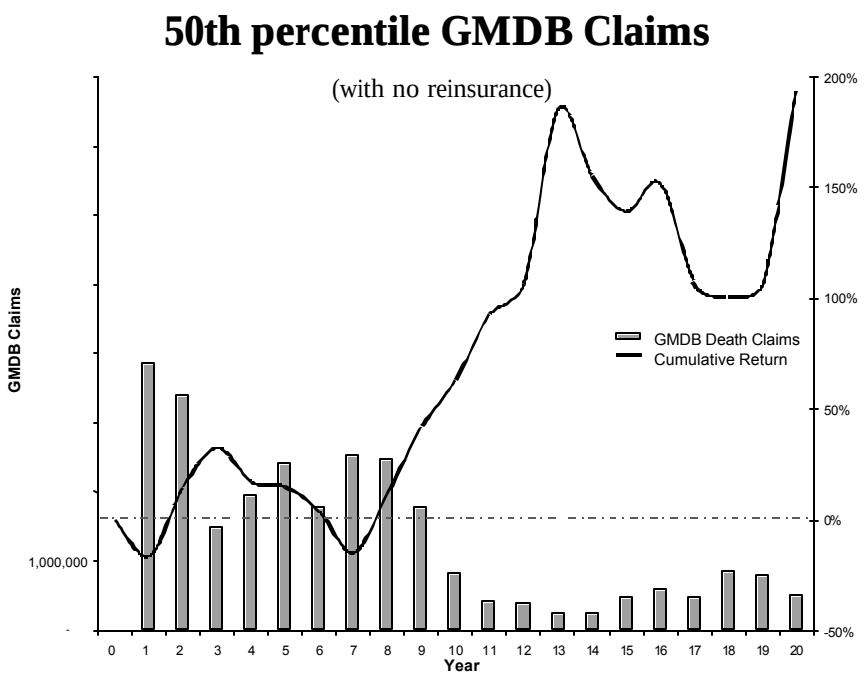
What are the risk-management techniques? Quota-share reinsurance. I guess many of the companies that are in the market today have some. It's probably one of their most valuable assets. If you bought reinsurance prior to 1998, you have a very valuable asset. Unfortunately, you cannot buy it today for eight basis points. In fact, you cannot buy it today. That may change as people reconsider and come back into the market. Now might be the time to get into the reinsurance market on a quota-share basis. But the market's not there.

We have seen some innovative things in terms of stop-loss reinsurance. I think that some of those transactions are valuable and others are not. We will talk about them from a pure-risk perspective, but they are certainly out there. There is also derivative-based hedging, which I will spend a little bit of time on. We've always viewed these options as costly, and there are other impediments to implementation, but I think that we need to recognize that, as the markets continue to under-perform, the desire to overcome some of those impediments should increase dramatically. Then I want to comment on natural hedges and diversification.

The amount of pain that somebody feels today if they're a 100 percent variable-annuity writer versus 50 percent is not 50 percent less because they are more diversified; it's even less than that. There are some benefits to taking a diversified view of the world. I think that should be one of the lessons learned about managing in any difficult time. If you look at a lot of the challenges that organizations have had over the past 10 years, you can almost point back to issues around concentration. Finally, I will talk about the idea of natural hedges. One of the best risk mitigation techniques is pure absence. Just don't write the business. You can't ignore that one.

From a reinsurance perspective, one of the great events of the '90s was that we invented variable-annuity guaranteed benefits, and almost simultaneously, reinsurance for those products emerged. The reinsurer took 100 percent of the exposure, and the ceding company would get full-reserve relief. The coverage was relatively inexpensive, and many of us still have it on the books and, like I said, it is a valuable asset. But just to illustrate reinsurance, Figure 9 analyzes a book of business that is "in the money," so it is not newly issued. It is an in-force block and it has a variety of death-benefit features in it.

Figure 9



If you pick out a scenario that's sitting around the 50th percentile, as measured by some sort of present-value measure, the markets go down (to me, it looks like 10 or 15 percent), then recover and go down again. They dip below zero around year seven, come back up and then take off forever.

It shows that the patterns of claims follow the scenario. If the markets go down, the claims get larger. If the markets come back, claims get smaller. This is not surprising. One of the points is that, even in a fairly benign scenario; we can still generate claims. You can do that even if you're looking at a pricing basis, or you're looking at it with a newly issued contract that's in the money.

Figure 10 reveals the fifth-percentile results. In a fifth-percentile scenario, the market goes down. It looks like the market bottoms out at about 40 percent down. Now, of course, these products were probably starting out about 10 or 15 percent in the money. This is what we've seen over the past couple of years.

Figure 10

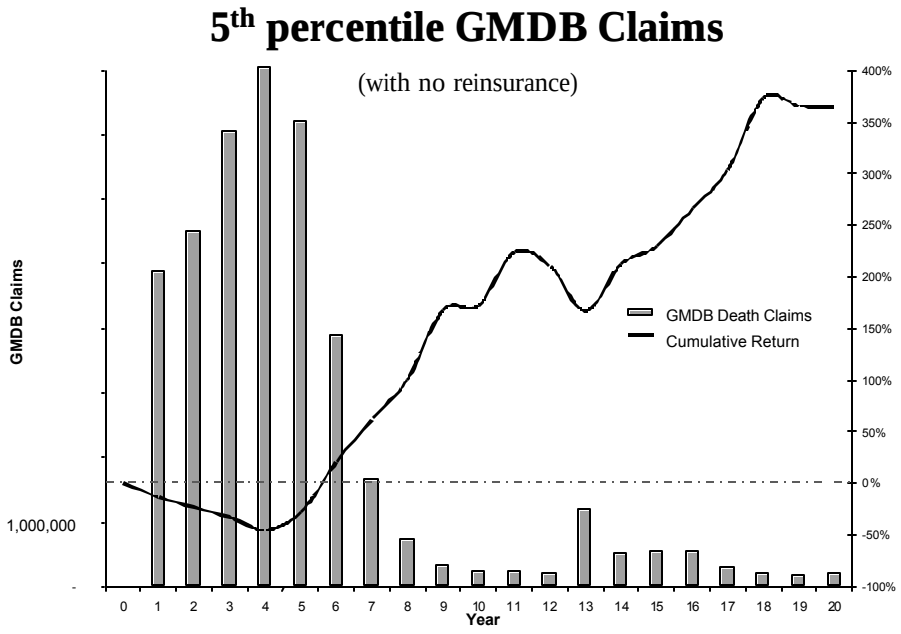


Figure 11 shows fifth-percentile GMDB claims net of the reinsurance premiums. It is the actual claims, minus the claims payment from the reinsurer. You end up with a much different picture.

Figure 11

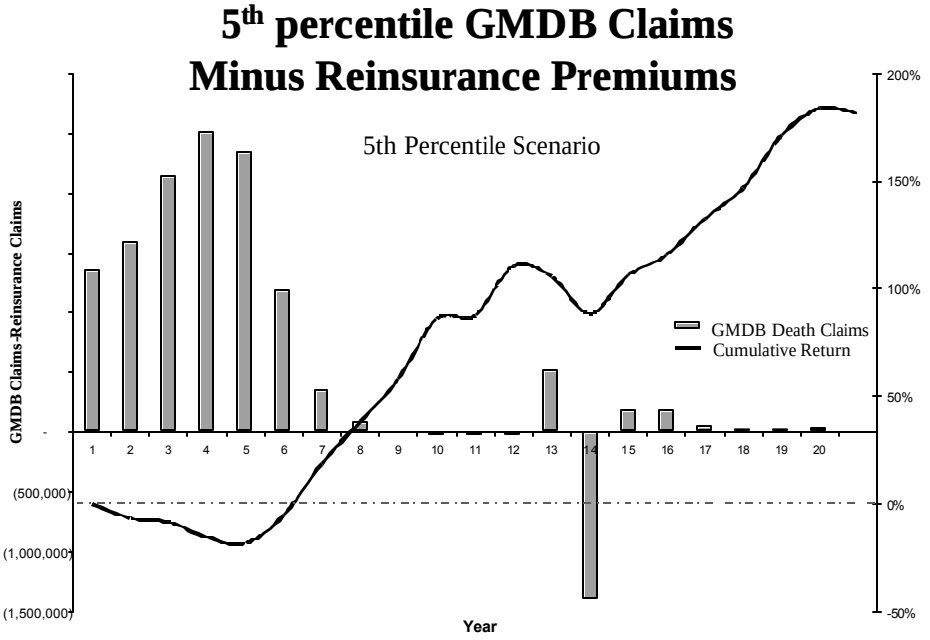
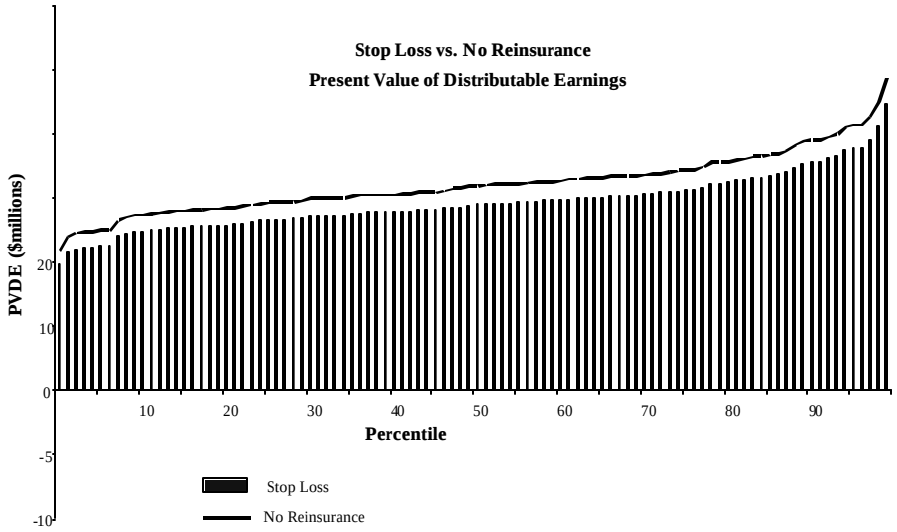


Figure 12 shows the results of running 1000 or so scenarios. We have done a present value of distributable earnings (PVDEs) calculation on the contracts embedded and ranked the outcomes from highest to lowest.

Figure 12

PVDE with and without reinsurance (Stop Loss Treaty)

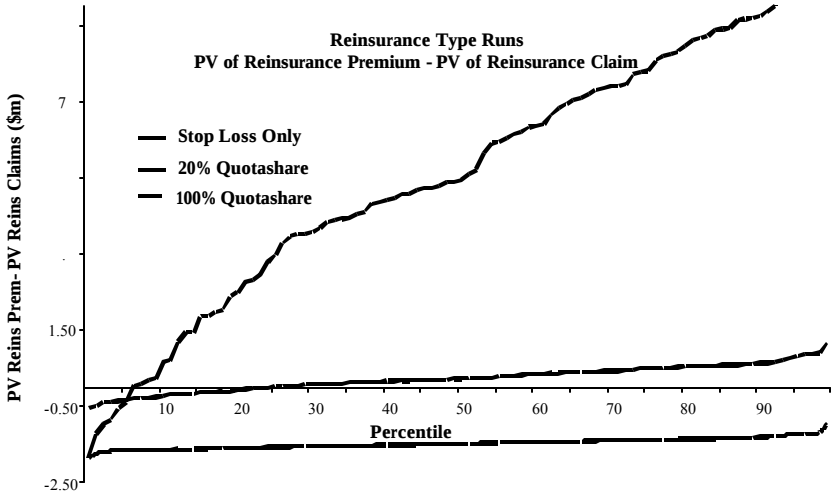


This shows that the stop-loss reinsurance treaty does not add any value. It basically says that there is never a scenario where the claims are large enough to get the kind of relief that you need in the tail. It is a tradeoff, but once you move away from a straight co-insurance arrangement, you need to focus on doing a rigorous analysis of the treaty, understanding when you get value from the treaty and when you do not. You also need to understand how much you are going to pay for that value and what it means in terms of statutory-reserve implications, as well, because it is no longer dollar-for-dollar. It is a different calculation.

Figure 13 takes a look at three different reinsurance arrangements for the present value of reinsurance claims minus reinsurance premium. The 100 percent quota share takes a look at what I would call an old-style traditional reinsurance treaty. Clearly, the claims outstrip the premiums in almost 95 percent of the outcomes. It is a good deal. The ceding company wins. Many of you might have treaties like that on your books. I cannot say it enough times—it is a valuable asset. Of course, you have some counter-party risk and the reinsurer is going to be there to continue to pay the claims. If you just look at a 20 percent quota share (what I will call a newer-style arrangement, which is what this one was), you end up with a more balanced view of the world. The claims exceed the premiums about 70 percent of the time, which means that it is a pretty good deal for the insurance company. But there is not a tremendous amount of value there, and 30 percent of the time it works the other way. It is a 20 percent quota share on a similar size block. The point is, again, the stop-loss treaty, as was proposed, just did not work. Now we will move on to derivatives.

Figure 13

PV of Reinsurance Premium minus Reinsurance Claim



Derivatives tend to be fairly intimidating, particularly when you are hedging things like GMDBs and GMIBs, or even hedging revenue risk. The problem is that you have a path-dependent liability in many instances if you are writing ratchet and roll-up benefits. You have lapses, mortality and all of these dynamic elements. The guys on Wall Street are perplexed. They know how to hedge fixed and certain cash flows. They know how to hedge something one year from now. They don't know how to hedge something 30 years from now. It's a very perplexing problem. If you put a hedge book in place today, how do you know that it's the right hedge book? You could do a lot of work or you could implement a hedge book, and some actuary comes along and changes lapse assumptions, and all of a sudden, you are not hedged the way you that thought you were. So it's a pretty difficult problem, and it's compounded by the fact that most organizations today are not really comfortable with managing derivatives books.

You have a difficult hedge problem, combined with a difficult skill-set issue, and it is not surprising that many people are not using derivatives to hedge the risk. The problem is that, given that the tools that are available today, it is probably the only option that you have. The other option is to "go naked and take your lumps."

There are two approaches to hedging, and I'll discuss both of them. They both have relative merit. Static hedging means that you buy long-dated options. You put a hedge in place, you monitor it as you go along and you don't have to do much trading. For those of you who have been around these hedge guys, you know that they're in the markets all day long, and the thrill of it is just trading all day. Whatever profit you priced into the products, they can trade away for you. But, the

idea behind static hedging is to somehow develop a hedge program for which you're really buying options with the idea that you can leave them in place, adjusting your position as experience emerges.

Figure 14 is a return of premium example. In this case, there is a five percent roll up and you have $100,000 in premium. At the end of year one, your death benefit amount is going to be $105,000. You can buy an option with a strike at 105, you can apply a mortality rate and you can end up with an appropriate initial amount. You can do that for the death benefit at the end of year two, and so forth. So there are certainly other more sophisticated approaches, particularly when you're dealing with ratchet benefits. The problem with the ratchet benefit is that you do not know what the death benefit is going to be one year from now. It's path-dependent. If the market goes up, the death benefit goes up. But you can use simulation techniques to find out what types of longer-dated positions might produce an acceptable result even in those instances. But as you work through it and you get down to the bottom point in Figure 13, it shows that it's not that simple. Because at the end of the day, you're out there buying S&P 500 futures, or NASDAQ or Russell 2000, but in reality, your customer has invested in a variety of different funds, and you end up with all of this basis risk that you can't ignore.

Figure 14

Derivatives-Based Hedging: Simplified Static Hedging Example

- Issue 5% Roll-up GMDB, assume Account Value invested in S&P 500
  - Want to hedge out claims exposure using a Static Hedge

Premium	100,000	
GMDB end of Year 1	105,000	Buy 1 year put option on S&P500 with strike of 105
GMDB end of Year 2	110,250	Buy 2 year put option on S&P500 with strike of 110
GMDB end of Year 3	115,763	Buy 3 year put option on S&P500 with strike of 116
.	.	.
.	.	.
.	.	.

- Notional amount of each put option is dictated by premium amount and decrement assumptions (lapse, partial withdrawal, death, annuitization)
- Can’t buy options on AV, thus determine anticipated asset allocation and purchase appropriate options (e.g. S&P500, NASDAQ, Russell 2000)

Now it sounds intimidating, but with the appropriate simulation techniques, you can actually find some very effective hedge programs using long-dated options. You can test some simpler hedge programs that are not as targeted as a GMDB-based hedging program might be.

Now I will talk a little bit about dynamic hedging. Basically, if you are familiar with duration, convexity and interest-rate-risk exposure, it is built around the concept of price behavior. If you have a liability that exhibits a certain type of price behavior, you can put a hedge in place or you can use assets that exhibit similar price behavior, and you are effectively immunized.

Now, over the years we've learned that it's not enough to be duration matched. You need to be convexity matched. You might even want to consider the third, fourth and fifth moment around the mean.

It is the same idea with equity-based exposures. You calculate the price sensitivity of the instrument that you are trying to hedge, and then find assets that exhibit the same price behavior. The metrics that one uses to measure the price sensitivity of equity-based products are called "the Greeks." Delta is a change in value with respect to the underlying, and in this case, it can be the S&P 500 or it could be the account value for variable annuities. It's a straight analogy to duration. Gamma is a change in delta with respect to the underlying. Gamma is to convexity as delta is to duration. The vega is a change in value with respect to implied market volatility. If the volatility of the equity markets go up, the vega will change. Theta is the change in value with respect to pure passage of time. Rho is a change of value with a respect to interest rates. The three that you will hear most people talk about are delta, gamma and vega.

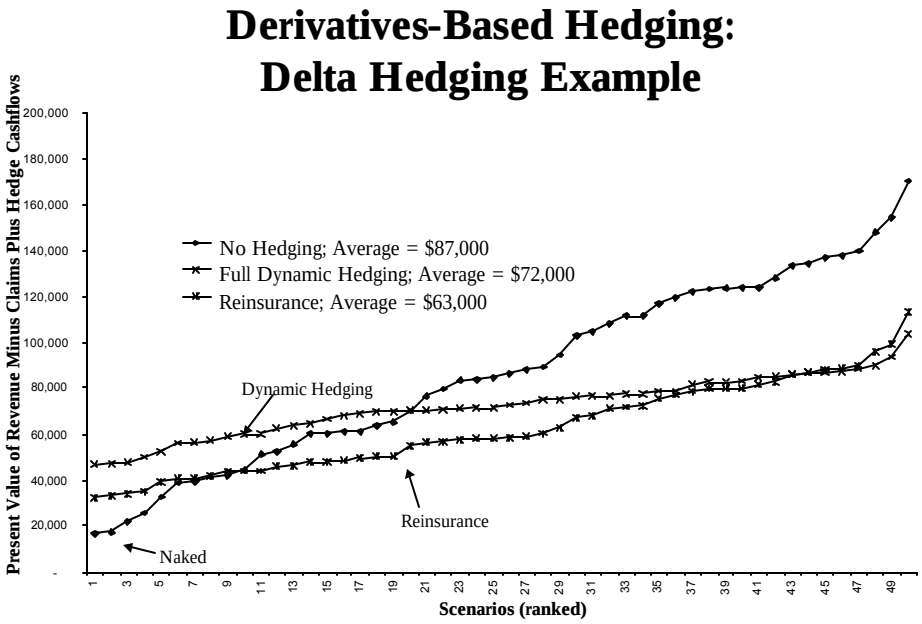
Delta hedging is the simplest and most common form of dynamic hedging, and it is analogous to duration matching. Delta hedging allows you to hedge a change in your business that is caused by a change in the market. When you start implementing these programs, you are hedged both ways. If the market goes up, it is as if the market didn't change. And of course, management is terribly uncomfortable with giving up the upside to protect against the downside and that's had its consequences. But the point to note is that if you do delta hedging, and you haven't worried about some of the other Greeks, you'll find that you're not as hedged as you'd like to be. It's the same thing with duration matching and ignoring convexity. If you have significant changes in the level of interest rates, you'll find that you weren't as matched as you thought you were. It's probably more pronounced in the equity markets because there is much more volatility in the equity markets, so gamma plays a more important role.

Of course, the more Greeks you try to hedge, the more expensive it becomes. One of the nice things about delta hedging is that you can do it using futures contracts. Futures contracts do not require much of an initial outlay. It is kind of a "pay as you go" hedge program.

Figure 15 shows a simple example of hedging. If we look at no hedging, we get an average value. We are looking at an entire contract, not just GMDB claims. We are looking at the economic value of the variable-annuity contract and the distribution, ranked highest to lowest, of the present value of revenue minus claims plus any

hedge cash flows, if it's one of the hedge scenarios. With no hedging, the average value of this contract is $87,000. This revenue is defined as revenue for the benefit less claims. This is just a GMDB example.

Figure 15



The value is $87,000. Now if you do full dynamic hedging (this means that you are delta hedging the change in the market movements from period to period), you end up with a $72,000 value. The difference between $87,000 and $72,000 represents the cost of the hedge program. One of the nice things about dynamic hedging is that it flattens out the line. The problem is what you have to give up on the upside. However, introducing reinsurance gives you that same flat line, but a lower flat line. You can get to the same place by implementing hedge programs.

Now, I have to admit that this simulation made some assumptions that I would not want to make in a more rigorous analysis of whether or not to hedge, but I just want to spend some time on the idea of hedging any kind of equity-market risk. I think that one of the first questions that most companies need to really focus on is, "What is risk?" Is risk really the volatility in the revenue and its implications for amortizing a deferred-acquisition cost? Is it the claims that will have to be paid out of pocket? Is it the reserve increases that you are going to have to endure, whether it be on a stat or a GAAP basis? Remember, there is something called the long-duration task force that looms.

I think that is one of the things that makes it difficult within organizations. You will frequently find that people will say, "Well, all of the above," which makes it even more difficult because you cannot devise a program that hedges against all of those

things. But if we go back to the whole risk-management process, I think that going through a process and helping people understand what the relative value of different options might be and the consequences of picking "option A" versus "option B" is helpful to management. I think what has happened is that the equity markets have gotten way ahead of us. This has created some very difficult times for us, and we, being the risk managers or those who are responsible for risk management within organizations, have not taken the thought process and advanced the analytics to the point at which we can help management make good decisions.

There is an old Italian saying, "He who hesitates is lost," and I have encouraged a lot of people in my dialogue to do something. I realize that it is expensive. Make an investment, buy a hedge, figure it out and you'll be better off. I am not going to say that implementing a hedge program for these products is one of the easiest things that you will ever have to do. It's very difficult. But at the end of the day, not doing it can be particularly painful and an organization should be taking the time and energy in making the investment. With that, I think we'll turn it over to questions.

MR. DONALD E. MORDEN: I have a question for Mr. Harewood that has to do with the GMIB design. I am wondering if you perceive that there could be future problems, because there are different interests between the agent's compensation and the client's needs. In particular, if these GMIBs get in the money, I understand that a lot of companies are not going to be paying compensation on the annuitization stream. Who is there to protect the client?

MR. HAREWOOD: Are you asking, in terms of GMIB design, if there is a misalignment of incentive due to the way the GMIB is set up so that there is no compensation fee on the exercising of GMIB?

MR.MORDEN: That's correct. In fact, it goes one step beyond that, because if they annuitize, the agent is going to lose his compensation on the deferred annuity at that point in time, as well.

MR. HAREWOOD: As to the proper design of a compensation system for insurance or annuity product, that is a bigger issue than it is on variable products. I think that there is still some work to be done in that area, but to address your question specifically, I think that there is going to be an issue there. People are terribly concerned about GMIB exposure. Generally, the GMIB design is set up in such a way that the guaranteed rates are really not that good of a deal anyway. Say you have a fund value of $100. If the GMIB is at $120, you are thinking it will be a $20 loss. But in fact, with the current rates on the annuitization, if the person cashed out and bought an annuity separately, the difference in the income stream is not really that significant. So, GMIBs are probably the least of the worries of the guarantees. That's the best I can do with that question.

MR. LEACH: I think that your question may be getting at the issue of who's watching out for the client in this deal.

MR. MORDEN: That is basically it, because the company does not have an incentive. It was not really in the money, in a real sense. If you doubled the account value, maybe you would have a real value. The agent is not going to be incentivized in order to tell the client exactly what he should be doing. The company is in a position in which, if this happens, this could be a very bad situation in terms of their financial position. Are they going to be promoting what is in the client's best interest? And yet, if we do not do that, I think that we stand at a large litigation risk. I think that we have to find a balance, but I do not know what that is.

MR HAREWOOD: As to the litigation, when you bring that out with the legal risk in terms of whether or not people are doing things properly, I do not have an answer for you.

MR. LEACH: I can just observe that, if anything, the industry is making the subject that you're raising into an even bigger issue, because some of the reinsurance treaties that cover this prohibit the payment of compensation. Not only do you have the direct insurers not wanting to compensate, but if they do, then the reinsurers suddenly are going to get turned off. So it is an issue.

MR. CHARLES R. WILLIAMS: I'm wondering if you have any sense for what the current exposure in the industry is to policies with account values below the current GMDBs. Have there been any material differences in lapse and mortality experience on that block of business?

MR. LEACH: I would guess, just from what I've seen, any policy issued after 1997 is quite likely to be in the money at this point, maybe even some before that. How much of the industry that represents, I guess, is a function of how much has been sold since 1997. But I think that quite a few annuities have been sold since 1997.

MR. SABATINI: I would imagine that they would be in the money by between 20 and 30 percent, maybe even more on the entire block.

MR. HAREWOOD: The thing to realize is that a lot of the recent sales have been exchanges, so we see net cash flows into the annuities have not been that large for the past two or three years. So 20 t to 30 percent is reasonable. It could have been a lot worse if it were not for the flurry of activity that occurred before the market crashed.

MR. SABATINI: I think that one of the interesting things in this environment is that any lapse may be considered a good lapse. One might even consider the idea of actually having an ad campaign, or some sort of communication with policyholders, to offer them some benefit to lapse. A lapse today basically means

that you are out from under the guarantees.

MR. LEACH: That's good news for the insurance company, but it does relate to the last question which is, "Who's watching out for the customer?" At least in the bigger broker/dealer firms, their compliance departments expect the brokers to go through a pretty significant process of thinking about whether the client should be moved on from a policy when they have a huge net amount of risk under the policy. So in that sense, the distribution systems are challenging the insurance companies in that area.

MR. SABATINI: From a hedging-target perspective, you will get much different answers, depending on the mortality assumption that you choose.

MR. RODNEY CLARK: With regard to that, we have been trying to gather information on the same issue recently. Some of the worst cases that we have seen are the net amount at risk underwater, about 40 percent of the account value, and most cases tended to be 20 to 30 percent. But as you said, they widely vary and are dependent on when companies sold the business. Companies have been telling us that the lapsation experience has not been anti-selective, but in fact, some of the most underwater annuities have been the ones walking away. But the experience is early.

I have a question directed toward Mr. Sabatini that springs off of some comments at the end of his presentation with regard to accounting, and particularly, on the GAAP basis. As you know, there is a widely varying practice right now with regard to DAC and to the guarantees for variable annuities on a GAAP basis. I have even heard that one major audit firm is advising clients that it is not appropriate to reserve on a GAAP basis for variable-annuity benefits. I find that interpretation to be a little bit baffling, but it apparently exists out there. I wonder what your opinion is on accounting in the industry, and what appropriate practice is. Is it your sense that the accounting firms, in general, are perhaps paying more scrutiny, given the current environment toward accounting practices for these products than they had in the past?

MR. SABATINI: I am certainly not going to be speak for Ernst & Young. Here is what I do know, and by the way, I will preface the statement by saying that I am not an expert on the accounting, which is why I do risk management. But having said that, it is my understanding that you are not required to reserve for GMDBs on a GAAP basis. There is a task force that is looking at and working on some new standards, but I do not want to get into that.

FROM THE FLOOR: I'm asking less with regard to what the requirements are than what's appropriate. Is it appropriate to have DAC assumptions that require 16 percent ongoing returns? Is it appropriate not to be holding any reserve, even if there is not a requirement or if there is significant underwater account values and significant risk in those accounts?

MR. SABATINI: I don't have a statement. I don't even come close to knowing if that's done.

FROM THE FLOOR: You made me smile when you said that the reinsurance market dried up in 1998, because if anybody was looking for reinsurance between 1998 and 2000, you should have come to the United Kingdom. It dried up in the United States and some reinsurers in the United Kingdom were taking it on. You might want to try some other countries that are familiar with the risk to see if they might pick it up for you. Otherwise, any reinsurance companies that are new in the market and trying to get business on their books might be able to help. That's another good target. My question, though, relates to the GMIB business. In the United Kingdom, we had lots of problems with guaranteed-annuity options; 60 percent annuitize on guarantees that were offered a long time ago and now have gotten into the money. Companies have huge reserves to deal with that business. I understand that in the United States, annuitization rates have been pretty low. They may be as low as two percent. How do you think that companies should prepare for the annuitization, because if you take two percent up to 60 percent, you could have an even bigger problem on your hands. In some cases, it's a compulsory annuitization. In other cases, you are allowed to take the money into the open market and take the annuity with somebody else. You can take a proportion as a lump sum as well, but you do have to annuitize part of it.

MR. SABATINI: The reason I asked the question was because that would be different. The GMIB product in the United States provides you with the option to annuitize. The primary focus of the product is to accumulate wealth, not to distribute it through annuitization. So it's kind of an embedded option being used to provide some comfort against market underperformance I would imagine. In the worst-case scenario, if the markets do not perform, you can annuitize and get a guaranteed level of income in insurance benefits. There are products different from that that will drive it, but I think that it is anybody' guess as to what level annuitization we will see once these things stay outside their initial waiting period. Then we will know, but it could be as you suggest. It could be different, because they can just take the cash and go.

MR. HAREWOOD: In addition, interest rates in the United Kingdom were fairly high—in the five percent range—and I think the guarantees that are offered in GMIBs are in the two percent range. So interest rates would have to fall quite a bit before you would lose the whole spread in the guaranteed-annuity rates.

FROM THE FLOOR: Combined with the longevity risk and increasing mortality, that led to effective guarantees being offered to policyholders from seven percent to more than 8.5 percent in the United Kingdom. That has been quite attractive.

MR. ARI JOSEPH LINDNER: I wanted to add something to Mr. Harewood's presentation that I've found to be very important in designing a product to cut out

risk. One thing that wasn't discussed was the anti-selection risk, specifically, the dollar-for-dollar reductions on partial withdrawals, which, fortunately, most companies have moved away from,. But all of those graphs and everything get thrown way out of whack when people are stripping their policies out. They are 40 or 50 percent in the money, they withdraw everything but the bare minimum and end up with free life insurance, or in the case where it was offered on GMIB, free money. That's one of the most important things that I can't stress enough when I talk to people about designing the product to avoid some of the risk. Eliminate that feature.

MR. HAREWOOD: That's a great point. Some companies have been burned very badly with this_dollar-for-dollar withdrawal, but it's pretty much gone in this design. When designing a product you need know what risk you want to handle and then you design your product in such a way that you take risks that you are comfortable with. Also, the other idea is that it will be driven by the particular market you want. On these products, there are very liberal provisions. But then three or four years down the road, you are likely to wonder, "What did I do?"

MR. SABATINI: My advice would be, first of all, if you have an opportunity to do reinsurance, that's probably better than anything in the options market, unless it's cost prohibitive. You will need to evaluate that, but it may provide you with everything that you need, particularly in terms of reserve. Now hedging does not give you reserve relief. It just gives you economic relief. You can get a reinsurance treaty because you need reserve relief. The problem that you have in the real, perfect world is that, if you're a reinsurer and you're hedging your exposure, you would offer the coverage to a direct writer, you probably layer a profit on top of your hedge cost. So in theory, you should be more expensive, unless you're taking some risk and not hedging at 100 percent.

MR. ARI JOSEPH LINDNER: Yes, I mean the difference is that there is diversification across companies and products and benefits. But I think that what you said about the price of the reinsurance and the price of all of the benefits really is true. I mean, in Mr. Harewood's example of 15-basis-point annual ratchets and five percent roll ups, we all know that those days are long gone. With interest rates at historical lows and volatilities at historical highs, you have to recognize that the option cost flows in there somewhere. The cost of the underlying benefit needs to reflect that.

MR. SABATINI: At the end of the day, the key is that these things are complex enough to make sure you do your homework in the analytics.

FROM THE FLOOR: Rather than joining the debate as to which one is better, I would make the point that, in reality, when you have a block of variable-annuity business, experience has shown that you're really looking at a combination of all of these things from a risk-management perspective. Generally, companies have sold this business over 10 years, or more. There will be some business that you sold in

the late '80s and early '90s, when holding some capital would be fine. You hopefully left some reinsurance in place on that business. There is some business that you have sold in the last few years where you may need to hedge the tail risk to avoid insolvency for your company, or at least a severe hit on capital. One thing that has not been brought up so far in the three presentations today is a point that I would like to make about bringing the cost of capital into the equation. When you actually do that, and you look at the likely requirements both on a stat and on a GAAP basis going forward, at least by 2004, if not 2003, you find that the cost of capital does become an additional argument in the equation and can make various hedging alternatives look better because you are reducing the capital level required through hedging, at least for some of the business. I think that is an issue that also has to be taken into account.

MR. DANIEL KANE: Another area that you have to be careful of is writing options that you do not realize. On the C-share product, what you are effectively doing on the C-share is writing a step-up benefit for free, because an agent can roll over and move from one C-share to the next C-share and step up their benefit whenever they need to. They have no incentives. The agent, after 12 or 13 months, gets a new commission. In fact, they might get a two percent commission. You have to be careful of the underlying options that are written on the product when you don't realize it.

MR. HAREWOOD: That is a good point. If you view a distribution channel from an operational perspective, you have to keep a close watch on your channel to make sure that you understand what's going on and that you don't allow certain kinds of activities to go on.