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## Session 99PD

### Equity-Indexed Insurance Products—Pricing, Investment, Accounting, and Reserving

**Track:** Investment/Product Development/Financial Reporting  
**Key words:** Equity-Indexed Products, Financial Reporting, Investments,  
Product Development

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**Recorder:** STEVEN A. EISENBERG

*Summary: The growth in popularity of equity-indexed insurance products is well documented. The participants of this session are given an overview of all aspects of developing and managing an equity-indexed proposal.*

**Mr. Steven A. Eisenberg:** Our first speaker is Bruce Crozier. Bruce is a consulting actuary with Avon Consulting Group in Avon, Connecticut. Bruce was previously the chief actuary with Keyport Life Insurance Company, and, in case you're not aware, Keyport was the first insurance company to develop an equity-indexed annuity (EIA) similar to our existing equity-indexed annuities (EIAs). He helped develop this product. His specialty is product development for both life and annuity. He has variable, fixed, and indexed experience.

**Mr. Bruce J. Crozier:** I'm not sure if the size of the crowd is a function of the weather outside or a function of what has happened in the equity markets over the last couple of days, but, hopefully, we can cover a lot of information. I think you're all aware of the success that EIAs have had over the past 2.5–3 years. Sales in 1996

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**Note:** Charts 1 and 2 are not available online but can be obtained through the SOA offices by contacting Linda Blatchford at 847/706-3564 or by e-mail at [lblatchford@soa.org](mailto:lblatchford@soa.org).

amounted to \$1.5 billion. We expect sales in 1997 to be approximately \$3.5 billion. That might change dramatically depending on how the market performs over the next several weeks, but it will be interesting to see how sales react, if, in fact, we have a continued down market for some period of time and whether that has a positive or a negative impact on sales. Certainly the jury is still out on whether or not at least a limited, prolonged downturn might, in fact, make these products even more appealing to people looking for that downside protection.

We now see about 50 companies that are in the equity-indexed market with probably about 70 different products. There are roughly 15 to 20 companies that are very close to introducing a new product, a slightly smaller number of companies that are in the serious development stage, and a large number of companies that are currently assuming a let's-wait-and-see approach. There has been some decline in the number of companies that are currently looking at or seriously developing products. The wait-and-see attitude currently prevails.

What I'm going to do is take a look at the impact of financial, regulatory, and sales and marketing factors in the design of equity-indexed products. I'll discuss the history and present the status of equity-indexed products, and how these factors might impact the design of these products in the future. Let's start with the early entrants into this market: Keyport and Lincoln Benefit. From a financial point of view, I think it's important that we all understand that there was much preliminary discussion of how these products ought to be positioned. Since there were no regulatory rules or regulations relative to these designs, a lot of thought and effort went into whether this product should be positioned as a registered or a nonregistered product. Was it a new animal? Was it a variant of a single premium deferred annuity (SPDA) or a fixed annuity? The early companies decided that the most efficient way to position these products was as a variant of an SPDA. That had a large impact on the design of these products, especially the first two. The other products that followed copied or made variations of those initial designs.

From a statutory and GAAP position we didn't know how these products would be treated. We didn't know what the statutory reserving requirements were going to be or how the assets were going to be valued, so the early pricing that was done on these products assumed that statutory reporting or statutory reserving and asset valuation would be done on a basis consistent with SPDAs. But the real focus, in the early design and pricing was on an over-the-term horizon as opposed to looking at year-to-year financial results because we didn't know what the reserves were going to be.

On a GAAP basis, pricing was based on the assumption that we would get to the basic underlying principle of GAAP accounting, which would be a matching of

income to revenue. In the design stage for Keyport that was well over a year. Option costs were cheap relative to today's environment. But option costs continued to increase over that 1.5-year period of time when we were in the design stage, and that had a big impact on the ultimate design that we chose as we looked at various products.

On a financial note the last thing is the development cost, and what I mean by that is the peripheral development cost, in our case administrative systems, which entailed putting in place the investment management technology, preparing the management of the asset portfolio and agent training and development, and getting the product to street. No one was sure that this idea was going to work. The costs were very high, even in terms of one product design. What we have seen and continue to see is that companies tend to focus on a single design because of those costs.

On a regulatory note, because of the way the product was designed, the nonforfeiture law was the basis for the values in the contract. This goes back not only to the guarantees but the methodologies that evolved for crediting indexed credits. We had this underlying requirement that we wanted to make certain that this product would fit within the SPDA concept and nonforfeiture law. Another point from a valuation point of view—because of the uncertainty with respect to reserving—was an aversion to putting any long-term guarantees in this product, and it was a combination of the cost of those guarantees and a concern about what the final outcome would be with respect to reserving. Policy form approval turned out to be a piece of cake early on. I guess we did a good job from one perspective or the other, right? Quite honestly, we all know that there was a lack of understanding, I think, on some level of all the details. And so, the policy form approval process was very quick and very easy.

From a sales and marketing perspective there were many initial doubts about whether this product concept could be sold. Forgetting what you can and can't say in a sales process, the basic concept of participating in the upside of the market with no downside risk was a wonderful idea, and the sales and marketing people loved it, but when they started to get into all the details and the complexity of the product, there was a lot of concern about whether an agent would understand it well enough to sell it and whether a consumer would understand it well enough to buy it. It became obvious early on that the participation rate was going to be the most visible factor in the product, so there was a lot of pressure, even in the early days, between simplicity and the participation rate—the participation rate won out, so the early designs—Keyport's vesting concept and longer term, high-water mark concept, and Lincoln Benefit's cap concept—entered the early product designs because of the need, or the perceived need, to get the participation rate as high as possible. We

went through many barriers, such as, "if the participation rate ever goes below 90%, we'll never be able to sell it," and, "if it ever goes below 80%, we'll never be able to sell it." We're learning that there's more to the product than participation rate, but that was very visible from day one.

From an agent training point of view, it was much more difficult than we had envisioned. From the agent training versus sales material level, we found that there was a high level of demand on the part of people who were going to sell this product to be able to understand all of the nuances of the product. Before they would try to sell one of these products to the ultimate customer, they needed to know how that product was put together, and how it worked. From a sales material point of view, we considered the trade-off between providing enough information so that the client would understand what they were buying and giving so much minutiae in that sales material that you'd turn the client off, and they'd never look at or buy the product. It was also complicated by the nonregistration issues. In many ways you'd like to be able to describe and explain the product through comparisons, but you were precluded from doing so because of legal issues and concerns about running amok with SEC regulations.

Let's review the second wave of products. From a financial point of view we sustained a very strong market through the first 12 months, as we introduced the products. It resulted in substantial sales. It had been a success. Option costs continued to rise, which meant that companies trying to enter the market were looking for additional ways to reduce option costs through cost containment measures and, again, minimal direction with respect to statutory and GAAP accounting.

From a regulatory point of view, there was increased awareness and growing concern on the part of state regulators with respect to these products. That was in two areas. One was investment management. Did companies truly understand what they were doing in terms of hedging these risks? Second, did the client understand what they were buying? Is the product being disclosed properly? Valuation, because of the unknowns, created an aversion to putting any long-term guarantees in the products and, again, limiting the underlying guarantee that the minimums required. Policy form approvals were beginning to become more difficult. Regulators were taking a harder look, and for those of us who had products previously approved, we were going through a reevaluation process with some of the states as they continued to look at these products. From a sales and marketing point of view, the early success of the companies that had the products drove other companies to get products to market more rapidly. The participation rates of the early entrants appeared to be unreasonably high as other companies looked to enter this market. There was a concern for companies that had products

out, about breaking these barriers that might cause sales to completely dry up. There was the issue that volatility rates were perceived to be at unusually high levels, so there was a belief or a hope that the cost of options would come back down as volatility rates decreased. From an agent training point of view, agents understood very easily that as interest rates drop, new money rates drop on SPDAs. There was, however, a training process that needed to educate agents on all the factors that went into setting participation rates and why participation rates may need to be going down when, if you'd look superficially at the market, there didn't seem to be that need for participation rates to decline.

So, in trying to compete with the products that were out there, we saw additional complexities with respect to participation, product features, or crediting methods to keep participation rates up and to cheapen the cost of options. Therefore, we saw point-to-point, averaging, and offset designs coming out so that you have the most visible factor in the product, the participation rate, continuing to look good in the marketplace. At the same time, we started to see more in terms of policy benefits, such as nursing home waivers, enhanced death benefits, and generous free withdrawal provisions—many things that were typical of SPDA products.

We still have rising option costs, and sales have continued to be strong. I don't think that there has been any appreciable change in sales with short corrections in the market. We've seen several during the time that these products have been in market that have not had much impact from a sales point of view. Alternative hedging strategies are becoming extremely important to new companies looking at entering this market as a way to reduce option costs and, therefore, maintain higher participation rates and provide better products for the customer. From a statutory and GAAP point of view, we're very close to many good answers. I'm not sure if they're great, but at least we know where we're going.

I'm not going to get into a lot of the details with respect to statutory reserving, but I want to go through some of the basic concepts. Most of you have probably seen *Guideline ZZZ*, and it does put you to sleep. It has been distributed in draft form. It will be the basis for statutory reserves for year-end 1997 in some states. From Illinois, it most definitely will be a big part of the Halloween letter and will apply to all business that's been written. So, it will be applied retrospectively. Basically, there are two types: Type 1, which used to be called book, which is the simplest method but does carry some baggage; and Type 2, which used to be called market and is more complex but certainly adds some flexibility. There are pros and cons to both methods.

The Type 1 method is by far the simplest. It's much easier to audit and to validate, and it produces reasonably stable earnings in most situations. It's not so much a

function of the method that produces stable earnings, but to be able to use Type 1 methods you have to meet hedges-as-required criteria that forces a close match between your assets and liabilities. Therefore, book values on your assets and liabilities move in tandem, so you get reasonably stable earnings. The basic concept is book value plus a discounted intrinsic value of the options. The book value basically starts the present value of the underlying guarantee plus the cost of hedging the option benefit that's in the product, and it grows from that value to the guaranteed value at the end of the term. If you have positive index movement, that's reflected in the reserve through the discounted in terms of value calculation, and if the index moves down, there is no corresponding adjustment on the other side.

What about the baggage? First, limited investment options. To use this method you satisfy what *Guideline ZZZ* calls hedges-as-required. A key component of this is buying options tied to the same index, with the same term, at the appropriate strike price and participation rate, that matches the values in the product. If you're using dynamic hedging, you will not qualify for a Type 1 reserve. Currently you would not qualify for Type 1 reserves, but there's a lot of discussion of whether or not you'll be able to use a Type 1 valuation method if you're using option replication. You have to certify quarterly that you continue to meet those hedges-required criteria. If, in fact, you fail to meet those criteria, you have to notify the state at the end of the quarter that you failed to meet them. You have one quarter to come back into compliance. Otherwise, there's a mandatory change to one of the Type 2 methods. Most importantly is the fact that this hedging strategy may be the most expensive. You'll be dealing with custom options and long-term options, which are not only the most expensive up front, but probably the most illiquid, so if you get into a situation where you need to liquidate some of those assets, it could cause additional problems for you.

There are two Type 2 methods, Commissioner's Annuity Reserve Valuation Method (CARVM) updated market value and market value reserve method (MVRM). They are more complex. Again, you can get into situations where you have earnings volatility because the assets and liabilities are not perfectly matched. That requires market pricing of the options embedded in the contract. You have to provide a certification that the assumptions that have been used in the calculation of the implied options in the product are reasonable relative to market conditions in the option markets.

MVRM is by far the least complex method, and in most situations MVRM will provide you with a reasonable statutory reserve pattern. If you have a product that has unique features, the CARVM-updated market value approach may give you a more appropriate statutory reserve for the products. Earnings will be stable if

matched. Here, there's no hedged-as-required test. You can, in fact, use an option replication or a dynamic hedging strategy that could be less expensive. Conceivably, and most likely, your option position will also be more liquid.

Currently, companies are focusing on the utilization of Type 1 methods, for simplicity more than anything else. Type 2 methods are only used if the company can't figure out a way to qualify for Type 1 reserving. You can avoid the complexity in all the market value calculations that are required under Type 2 methods, and it's much easier to get your valuation system up to speed if you do a Type 1 method. Finally, what we are learning as we look at these products is that the long-term guarantees in the product can result in some real surprises from a statutory reserving point of view. What might have appeared to have been a relatively reasonable long-term guarantee in terms of an underlying lower participation rate can, in fact, have some impact on statutory reserving, regardless of the method that you're using.

From a regulatory point of view, these products are heavily scrutinized on the state side. The regulators are looking very closely at product features, investment management, and sales and marketing materials. Some states have aversions to certain product designs or all product designs. The approval process is slower than ever. It's a very complex and time-consuming process. On the SEC side, they are addressing the issues and looking for industry justification whether that product should be registered. In a request for comments, some people have adopted the position that these products ought to be registered. Other people don't agree with that interpretation of the request. It's hard to tell which way they're going to go relative to whether or not these products need to be registered.

From a sales and marketing point of view, what we've seen is the success of almost every product that's hit the street. Given time for the product to be understood, nearly every one has met with excellent sales results. The participation rate is still very visible, but it doesn't carry the same importance that it did previously, and I think that is because people are becoming more comfortable with all of the nuances in the product. Averaging might be better, and it might be worse. It depends on what happens. And so because of these complexities that were introduced to get the participation rate up, people are now focusing on the total picture. On the other hand, simplicity is a big issue. Disclosure and market conduct issues are a big concern. And since most of the product that's on the street is slightly different from any other product, one should make certain that a client who buys one of these products understands what they buy is not an easy thing. From a sales point of view, it is important to have a simple design.

The next issue is market conduct. Agent training is getting more and more intense. There are companies now that require agents to go through a formal training

program before they're allowed to sell. Some companies even require their agents to take a test before they're allowed to sell the product. Sales materials are being closely controlled at the company level. There is a limited use of illustrations, and, for the most part, illustrations are being used to explain the mechanics of the product instead of being a projection of what, in fact, you might want to have. I think it's very important that regardless of the sales process we meet the reasonable expectations of the buying public. Since you don't know exactly what you're going to have until the end of the year or maybe until the end of the term, if those client expectations are much greater than the actual product performance, you're going to have a very dissatisfied buying public, and that's going to hurt persistency, which is important for any product. There's also substantial work being done on buyer's guide and exactly what will and won't be allowed from an illustration point of view, and one of the basic concepts in the buyer's guide and illustrations disclosure is the balancing language concept; that is, if you're going to describe a product feature, you have to describe both the pros and cons of that product feature, whether it be averaging or whatever.

Looking to the future, one of the areas that many companies are looking very heavily at extensively is investment management. This goes back to, as option costs continue to rise, using option replication and dynamic hedging strategies to manage the portfolio. They will become increasingly important as a way to control costs and provide the best product for the consumer. It's a means to, obviously, a more competitive position, but it does carry some cost because investment management is not cheap, and the expertise to manage a portfolio to do dynamic hedging requires a high level of sophistication and some high-powered, costly personnel to manage that portfolio.

Regarding valuation methods, I think we will see more companies move from Type 1 to Type 2, even if it isn't mandatory. Many of them will be driven there because of investment strategies and change in strategies, but I think as valuation systems catch up with the concepts, all the baggage associated with Type 1 valuation methods might become more difficult than just dealing with the MVRM method at the onset.

From a regulatory point of view on the state side, there is a model regulation that I believe is in the drafting stage that will lay out the filing requirements, which will include the actuarial memorandum and the information that's provided to the policyholder after issue. You'll be required to talk about your hedging policy and advertising and provide all the sales material. It should be a relatively complete document that will do two things. First, it will help to educate the regulators about all facets of the product. The other peripheral benefit is, hopefully, it will speed up the whole process of getting new policy forms approved.



With respect to the SEC, my personal feeling is that most of the products that are on the street will survive with some minor modifications in a nonregistered format. I'm sure we will see products that will have to be registered. There are two products currently on the street that are registered versions. One of them is registered because it has a market value adjustment formula that forces it into registration. I'm sure there will be designs that will fall into the registration side of the equation. We're also seeing variable annuity products that are adding guarantees to surrender benefits that will make them look a lot like equity-indexed products in some basic areas.

From a sales and marketing point of view, I think we're going to be in a push-and-pull environment. We're always going to be pushed to find minor variations, and that will make our product more salable or look more competitive in the marketplace. On the other hand, the full disclosure issues will mandate simpler product designs, and some standardization regarding the various crediting methods that are used within equity-indexed products.

What happens in the equity environment? I think it was more important in the debut of the product when it was still trying to get a foothold, and we had a very compatible market condition. We did not see any prolonged corrections in the market, which could have been extremely detrimental to the early development of the product until it got a foothold. Now, I think this product could survive a sustained market correction, though that certainly could and probably would impact sales for a while, but I don't think it would have the same impact as it would have had before.

In summary, I think we've had a very successful start with this product from a sales point of view. Many of the issues are being resolved with respect to investment management and reporting. Much work has been done by people in the industry to get these issues on the table and resolve them. That's been very promising for those of us who were in that market. I also think that the product is positioned for the future. What I mean by that is this product fits another client need; therefore, it will see great years, and it will see mediocre years, just as SPDAs and variable annuities (VAs) do, but I think it fits another need in the marketplace.

**Mr. Eisenberg:** We should have plenty of time after this next speaker to answer any questions, and I would also say it looks like there are a number of other experts in the audience who might be able to make comments or answer questions if we get stumped up here. Our next speaker is William McKinzie.

Bill is a lawyer by training, and he began his work in 1984 as a banker, participating in leveraged buyouts of insurers. He's been working with Credit Suisse Asset

Management dedicated to insurance clients since 1993, and he does focus on asset allocation issues and importance of diversifying portfolios while taking an acceptable tracking error risk from liability benchmarks. He has authored some papers. He co-authored a paper on property and casualty asset allocation, and he's also been published in *Contingencies on Annuities Management*. His latest paper is on global growth in insurance markets and asset allocation challenges to when entering developing markets. He has addressed the Society before, in 1994, in dealing with the investment challenges of minimum crediting rates on annuities when we have a low interest rate environment, which is where we are today. His firm has the longest track record and is the largest fiduciary hedging manager in the country with over \$10 billion of their total of \$120 billion of assets under management dedicated to risk-tailored strategies.

**Mr. William T. McKinzie:** It's an honor to address the Society again. Given the events of the last couple days, maybe things are more timely than they might have been otherwise. I plan to focus more on process rather than prognostication, but I am going to try to use certain events to point out why some processes may be superior to others. However, that's kind of a difficult situation. It reminds me of an old legal maxim: Hard cases make bad law. So, I'll be careful about that. For those of you who must know, after opening down 3%, the Dow, as of 1:30 p.m., was up 2%. Standard and Poor's (S&P) was up around 3%.

Some people have asked me, "Does that mean this is all over?" and I would say it's too early to tell. I would note that in 1987, after bloody Monday, when the market fell 20%, a week later, having some interim days, the market did fall 8% on October 26, 1987. So, it's still a little bit early. People also have asked me, "What's the big deal with Hong Kong?" Why does that matter? The U.S. has only 2% of its gross domestic product (GDP) tied up in exports to Asia. It really doesn't matter that much. Another thing to keep in mind is that Hong Kong has had 15 months where they've been down 15% or more in the last 10 years. Hong Kong is, by nature, a somewhat volatile market.

But speaking of prognostication, I was at a luncheon last week where the speaker was Steve Forbes, magazine publisher and erstwhile Presidential candidate. It was pointed out that Steve is a 4-time recipient of the Crystal Owl Award for accurate economic forecasts, and so, at the luncheon they asked him for a forecast and he predicted that long bond rates would fall below 6% in the next 12 months. He didn't realize, of course, that within a week we would go down to 6.15% on the long bond. It has since gone up to 6.23%. But if these conditions persist, as Steve pointed out, I may be dusting off that minimum interest rate guarantee talk I gave several years ago.

As events in the last few days have shown, low interest rates are not necessarily good for stock markets. Keep in mind Treasuries are a haven in times of trouble. The events in Asia are now hitting closer to home, and long bonds have been rising in value as stocks have fallen. One thing I am certain of, though, is that recent volatility in the short term is not good for the cost of hedging EIAs. Chart 1 compares a history going back to 1989 of one-year implied volatility, which is a measure of the pricing of options versus one-month experienced volatility. Essentially what you see with something like this, is that implied volatility does follow what is actually happening in the markets. Take the Persian Gulf War, for example. We saw, in August 1990, a lot of experienced volatility, and, of course, implied volatility spiked at that time as well. As a note, I might say where we are, though I will say it might not have been the easiest thing to price, but where our people would say: one-year implied volatility today was about 24. We're not quite up to the Gulf War levels today, but we had a market setback in December 1996. We then had the June setback. We also had some recent spikiness which the table reflects, and, as a result, as Bruce pointed out, we've seen a rise in implied volatility and cost. According to Bruce, when they were designing the product back in the 1995 era, they didn't realize that they were experiencing a period of low volatility. It has risen since.

For those of you who are less familiar with the impact of volatility, I have an example of a typical 5-year product priced a while back. Table 1 shows how volatility impacts option cost if 5-year volatilities are at 14, 18, or 22. Today it would be higher than 22. This is just for those of you who have not been dealing with this as much. What does this implied volatility mean? I'm trying to give a frame of reference in terms of cents on the dollar if you were to spend that money up front on an EIA.

TABLE 1  
HEDGE COST—EXAMPLE OF  
IMPACT OF VOLATILITY

<b>5 Year Vanilla at the Money</b>	
<b>Volatility Percentage</b>	<b>Option Cost</b>
14	21.9
18	24.3
22	26.8

Since options are priced for implied volatility, I would say that in our view, even before events, volatilities have been relatively high, and they've become a lot more expensive in the short run. There's been a sense of nervousness that's been behind this, and I know at least one recent magazine that wondered if all would be fine if

the market would just crash. Get it over with, let the blood flow, and we'll go forward, much like the person flying down Wall Street with a bungee cord, assuming that if we could just crash, things will bounce back quickly. I don't know, and it's too early to say whether we're going to have a crash or not.

Some of you may not have realized that this is the first time that the circuit breakers kicked in at the New York Stock Exchange in futures markets. These circuit breakers changed the picture somewhat. On October 19, 1987 the market fell by 20%. That cannot happen in one day because of the circuit breakers. The issues in 1987, when we had huge volume and a big decline, were fundamental ones. There was concern that stocks wouldn't clear. People wouldn't be able to evaluate margin calls. Liquidity wouldn't be there. The whole process—the mechanical side, if you will—might freeze up.

They installed circuit breakers to make sure the market would always clear on an orderly basis; that there would be no fundamental doubts about the ability of all the banks to settle things. One consequence of that, however, is that the market did close. That means that there was no market pricing information coming out of the system, and so when things opened, pretty much immediately it was down 3%. In a sense, that was from the last reported information. Obviously, a little bit happened overnight as well. In certain markets that might be closest to us—in Japan—they have a similar system. It works somewhat differently. Japan was down 4% last night, but any stock that opened was down 7% or 8%. Many stocks never opened because of the way they work circuit breakers. Sony never traded last night in Tokyo. These circuit breakers have the effect of breaking things up, which is why I would refer to the old maxim that dead cats bounce too. The issue is we don't really know, and I guess from our firm's perspective we take our time and try to avoid trading in disordered markets because it can be very expensive.

The implication, of course, is that things would calm down quickly. I'd like to go forward and take another look at implied volatility and the rise of the markets. I commented earlier on the setbacks that we've had in the market. Slight setbacks have driven volatility up, but maybe going forward, even one more look at the past will give an even longer term perspective. For Chart 1, the right scale is a logarithmic S&P 500 index from 1945 to about a week ago. If you'll notice, the volatility scale starts at 5%, and goes up to 23%, mainly because the only time that experienced volatility has exceeded that is the 1987 crash, and that would head into the 30s. This looks at experienced volatility. We do not have implied volatility dating back to 1945 because there weren't options markets in 1945, but in Chart 2, I noted that the implied volatility of options prices follows somewhat what happens in experienced volatility, and I guess this is the long view.

Looking at Chart 1, these products were designed right in the last trough on the right. Since then, we've seen a steady climb in the black space. That is that rise in volatility that we have seen since these products were designed. Taking a long view, this kind of volatility is not extraordinary by historical standards. This has happened a number of times before, and it's not going to last forever. To give you a perspective, the Gulf War gave us the 17% spike just before the last trough. Keep in mind on Chart 1 it was the big spike. The spike running off the top of the chart is the 1987 crash. Near the beginning of the chart, the Korean War gave us an almost 21% spike. Before that, the nearly 23% spike is the 1973–74 bear market. And, as you can see, normally when the S&P 500 squiggles down, the black space spikes up. The answer though is, if you look, these things don't last forever. They tend to calm down, and if you look at where most of the black space is, it's really down in this 11% in experienced volatility level. We were down to around 5–7% in the mid-1960s with very calm and not too volatile markets.

How does this relate to pricing? It's not a direct effect, but it means that when the product was developed we were in a favorable environment, but not extraordinarily favorable by historical standards. We've since had a spike upwards. We're not up to Gulf War levels yet. Nor is this unprecedented. The point is that if you're serious about these products for the long term, these environments will occur. They're just part of the management of it. I know in talking with some of the actuaries designing products much of testing work has been done on how individual designs are going to behave and how consumers are going to behave in a variety of environments, and I think the testing is worthwhile because we're going to experience a variety of environments.

I would say this is not going to last forever. If people had questioned us about what we do with new hedges, our prior view would have been, in terms of current option prices, that out to a one-year term things were expensive, but priced fairly. The hedges that we're involved with pricing we would put in futures, and we would only buy volatility out a very short period of time because it's only being priced fairly for a short period of time. I'll get into this more when we get into the structure and management of it. We believe that volatility is mean-reverting. Options pricing is going to eventually fall. Bruce described the process since the beginning of this product, with options prices rising. We introduced new features. The marketing people got comfortable with lower participation rates. At some point this is going to turn, and participation rates will once again be able to rise. I would say that the bottom line is that this kind of market movement could be a potentially great opportunity for EIA sales. U.S. consumers have been drilled into their heads that the stock market is the place to be if you want to retire. I think this is one vehicle with a protected downside that is appealing to a segment of that market. It's a worthwhile product.

Turning away from this general market information, let's talk a little bit about specific investment issues involved with EIAs. Let me just review for you some of the common design features that you see. Obviously, there are many twists and turns you can overlay, but as a review I thought I would go over a couple of design components and what they mean in hedging terms. From an investment perspective, the simple point-to-point design is a single, vanilla call option. It's very simple. Depending on the term, this type of thing is in some cases, traded on exchanges. When it comes to the averaging methodology, as Bruce pointed out, some environments will work better than others; all that is doing is sliding the notional value. If you were an averaging client, you wouldn't have cared about your anniversary date because it only counted for 1/220th of your value in the last year, particularly if you did a one-year average product on a daily averaging basis. Yet if you were a one-year, point-to-point person, anniversary date wouldn't necessarily have been the best, as it was for somebody out there. A cap design essentially is buying and selling call options, dampening some of the volatility. With cliquets or ratchets, you're essentially linking together a series of vanilla options. The most complicated designs are the look-back, high water-mark designs. Those do have path-dependent payoffs, and I will say as a comment on the investment side, when you have a product like that, if you called your dealers today and asked them to price an option to support a seven-year, annual look-back-to-term EIA I would venture you wouldn't get a price today. I'm quite serious. I don't think dealers would have been quoting exotics today. There are many pieces that go into that from their perspective, and there was simply not enough pricing information among the components. All the vanilla components were having some pricing issues. It would have been tough. So, I would say even from the vanilla side it wouldn't have been easy today, but with some experience one could make a good, reasonable market estimation. It's much tougher today with the more exotic products.

In terms of the strategy for this, it's our view that you do need to integrate the way you're looking at options and your underlying bond portfolio. For example, previously you were not getting any benefit from taking replication risk, and I'll talk about that in a minute. Today, of course, as I commented earlier, we definitely are replicating, but proper bond positioning. For example, had the recent interest-rate movement occurred absent the stock market movement, you would have seen, as we have seen before, corporate spreads widen out and become the best buying opportunity in quite a while. We've seen extremely tight corporate spreads. Not so much movement occurred in the mortgage-backed market with this decline in interest rates. Again, the opportunity to take risk—maybe a little additional total picture risk on the bond side. Even if there's no reason to take any risk on the hedging side, by integrating the two you should be able to optimize your risk perspective.

Also, in managing risk it's essential to track risk in the liability, if you can track the liability's behavior. The key, of course, is tracking the overall risk of the combined portfolio. That is the measure of risk. This is the piece that makes it somewhat more complicated than an SPDA because you have another valuation piece to track, and the real way to manage the overall portfolio is to track the liability, which is essentially a customized job. Again, I've already addressed that.

Now, if you're this far in, and you're just saying to yourself, "I don't want to deal with derivatives," reinsure the thing. I'm very serious about this, particularly with companies who don't have particularly large books. As this product rolls out and develops, reinsurers are going to develop sufficiently sized books where they're going to get some offsetting characteristics and be able to pass on less expensive solutions under treaties than you might be able to do on your own. I think that is a very valid option for a lot of companies.

But, if you want to keep rolling with me here, on the equity side the basic decisions you have are to balance cost and risk, and I would say that these decisions—and I'll comment with some specifics in a minute—depend on market conditions, but your first alternative is essentially to fund now. It's not something I would recommend for a seven-year term product, but if you wanted to lock it all up, you'd lock in today's current volatilities, which are extraordinarily high, but that's one option. Eighteen months ago we felt volatilities were relatively cheap, and we were buying volatility out as far as we could, or as far as we thought there was value out on the volatility curve, which may not have been completely determined, but that's one decision you have to make, and when I was listening to the accounting debates that I have been following with interest and meeting with the regulators, that's one issue. They seem to like the idea of funding now, that somehow everything is certain. Economically, that's not going to be reasonable. Today would have been a horrible time to try to do the fundamental option.

Another alternative is to take rollover and reinvestment risk, and this may or may not involve replication. This is simply deciding if you have, for example, a ratchet design, that instead of buying a ratchet design, you buy a series of five-year call options. Or, you might just buy the first year, but not buy the others. That replication is a little bit different. Replication is a way to implement decisions you take on risk, and I'll provide more detail in a second. We would be both replicating and taking rollover and reinvestment risk. We would not have been replicating, but we would have been taking rollover and reinvestment risk, and by that I mean that if it were a seven-year option, we would not have gone out seven years and bought the entire volatility. As I said earlier, our view was that one-year volatility was being priced fairly. We would have gone out one year, but we would have taken

rollover risk. We would not have been replicating, which is using even shorter dated options to create payoff patterns. I'll touch on that in a minute.

How do you evaluate the option risk? It depends on the market. The overall level of implied volatility helps dictate how long a term you want, and it has to do with what your perspective is and where volatility stands and value can be. For a seven-year annual ratchet, for example, it's a series of forward, one-year options. You could fund all seven years now with a customized contract, locking in volatility to term. You could buy an option for the first year only or you could do what I'm suggesting, which would be to use replication, in which you would buy some futures and some very short options that are expensive, but you will only lock into those expensive prices for a month or two. One important product item is the interest rate, which on the equity option side we suggest you hedge out to term or manage in an integrated basis with your fixed-income portfolio. It is something that you can do.

In all cases when I'm talking about what target option to hedge, they're always dependent upon your actuarial assumptions as to persistency, and this is the dynamic piece here. If you think 40% of your people are going to be there to term, obviously you're not going to hedge 100% of the options—the equity risk to term. But those assumptions, as I brought up earlier, and some models I've talked to people about, are somewhat dynamic. Obviously, what's a consumer going to do? Whether the market's going to crash or it's going to soar, there has to be some feedback mechanism there because if you keep hedging, you can either become grossly overhedged or underhedged if you're not tracking your actuarial assumptions. In a sense, as actuaries, don't forget, you're ultimately in the driver's seat as to how much hedging gets put on. Your investment managers will turn to you and ask, "How much of this do you want hedged?" They're going to then execute as efficiently as possible how much you want to have hedged. They'll tell you what they think. You'll get some feedback. This is the price that'll affect your thought about persistency. But that underlies all of this.

A note about replication and what it really is. We've saved our clients an average of 100 basis points a year on the cost of one-year options for over a decade primarily by engaging in replication when the time is right. That can make a huge difference in the Internal Rate of Return (IRR). Essentially, the process is the same whether you're going to replicate or not. You need to calculate the dollar value of target options for all market levels at a future date. This is something built into actuarial assumptions as well. But if you create a basket of futures and other shorter dated options that create the same payoff pattern and a contingent immunization, you can lessen the cost overall of options versus the alternative of buying then to term with a dealer. We essentially solve for the lowest cost portfolio that matches



the target option on a future date regardless of the market moves. The hedge is adjusted for any changes in interest rates or, in some cases, the interest-rate component is hedged out completely. Although it frequently lowers the cost of hedging, it's not always the right thing to do. It is very much a customized, case-by-case situation.

As you create a time diversification in your book and get a sizable book, some of this is going to begin to simplify, and you'll end up being able to manage it more like a book of business, but certainly to start, if you're going to engage in any replication, it's customized to the situation and the actuarial assumptions at the time. Essentially, the process tries to create a \$5 option with only \$4. We call it active implementation. I know Bruce brought up the concept of dynamic hedging. I would just draw this distinction, which is frequently lost. Maybe it's a technical thing, but in a hedging business, dynamic hedging refers exclusively to the trading of futures contracts to replicate a payoff pattern. There are problems with being pure dynamic hedging. Suppose the futures market closes and it opens up at a different level today than when it closed. There was a gap. If you were a pure dynamic hedger, you could not have traded futures in the market to make up the difference between the close and the open. We always use options that automatically adjust in price, and adjust our positions. But it is still active implementation.

It can and has, as I said we've been doing this for a decade, saved people money, and the important thing to keep in mind is, if any of our clients called, and, in general, we call them, they were assured that all their hedges were intact. Simply because you're taking some rollover risk does not mean that you are not hedged. It all focuses on the ultimate cost of the hedge and, if managed properly, can save money. Bruce was saying that people are going to move this way, and I would agree. Some of the systems on the accounting side of this could not launch many of the early products, but I do see this is where the industry's heading.

On a fixed-income side, with some designs this can be more complicated than an SPDA. Essentially, you have to structure a portfolio that obviously is going to fund the option purchases and provide liquidity for lapses, while keeping in mind that the actuarial assumptions can shift. This is dynamic. If you have certain liquidity options allowing people to roll to some other instrument or you've given them some other liquidity, that can affect the use of mortgage-backed securities. If you've built in an option for the consumer that has convexity characteristics that run the opposite of a mortgage-backed security that has negative convexity, they will highly restrict your investment people's ability to engage in the mortgage-backed market, which you may not want to do if they think there's value there. You can offset that somewhat with puttable corporales that have positive convexity.

When you're balancing your design, keep in mind that you don't cuff your investment manager's ability to add value in other ways. When you're balancing return on risk, obviously issue an out-and-out cash flow in the early days versus moving to more of a duration match. How much credit exposure can you take? I brought up this example earlier. We weren't engaging in any replication risk that would have increased the credit risk because when rates fell, corporate spreads widened, creating some value opportunities that fixed-income managers, frankly, hadn't seen in several months. There's the issue of total return versus yield, part of my speech in 1994 about high minimum guarantees in a low interest rate environment. It is hard to do this on a pure yield basis. I will be lecturing my corporate cousins at First Boston about this next week, actually, but the focus of the stock market analysts are on operating earnings and ignoring capital gains and losses. Gains and losses are a fact of life, and this industry will be better-served if it can focus more on total return and less on yield and operating earnings.

In terms of benchmarking and managing the tracking error to this liability, no static benchmarks are appropriate unless you have a very stable book of business and some stasis point where your sales are matching your benefit payments and looking more traditional. A dynamic benchmark is necessary if it needs to be based on the profitability of the business, by which I mean taking an internal rate of return approach to determine whether your fixed-income management's adding value or not based on the market value of the assets on hand to meet the progression of minimum required cash flows. You take into account the lapses that you're expecting, the experience and the liquidity features, and the minimum guarantees.

If you have confidence in your actuarial projection, you should be able to develop a duration of the liability and develop worst-case internal rates of returns. One example would be if a product deals with a flat stock market over the whole term. Flat stock market means your options are trading close to at the money, which is more expensive than if the market goes up and they move well in the money. The return will go up or down based on investment performance, which includes the management of the options and the actual policyholder experience. One can perform actuarial gain and loss analysis to determine returns along the way by segregating the asset and the liability components. It's necessary to hone the risk analysis. Obviously, it is dynamic. The duration targets are going to change in a dynamic process until the book has enough time diversification and stability to reach a steady state.

I would say in summary that the current equity option volatility environment is neither extraordinary, nor is it going to last forever. Volatility is mean-reverting. The management of the investment side of this product needs to be customized, and the return measure needs to be IRR based. We need to keep in mind, both the

fixed-income side and the equity side. I think this is a product that's going to have a lot of appeal and could offer a very good marketing opportunity with the current environment. I wish you all well in designing and selling these products.

**Mr. Lloyd A. Foster:** Almost all the EIAs I've looked at so far seem to be concentrated on one or two indexes, most notably the S&P 500. Is that because we have to pick indexes where we already have options traded on them? In fact, before we answer that, will it really matter? Is the choice of index that you pick going to be a marketing advantage, and, if it is, are we restricted because we have to pick something that has marketable options?

**Mr. McKinzie:** Well, I can speak on the investment side, and I'll let Bruce talk about the marketing side. There's been a lot of focus on the cost of the hedging. Cost is a function of liquidity. We put on hedges of all kinds for clients, but, for example, do a Russell 2000 hedge. It's more expensive than an S&P 500 hedge simply because there's less liquidity. There are, therefore, bigger spreads involved with the other indexes and indices. You can do it, but it'll cost more, and that will impact participation rates.

**From the Floor:** It might end up just like offsetting or canceling. You might as well stick with what you have in the cheaper type.

**Mr. McKinzie:** Unless there is a liquid market or a futures and options market behind it, it becomes tougher. We do trades on the French Chak. There is actually decent liquidity in there. There's not a lot of demand for EIAs based on the French Chak. The S&P has been picked simply because it's the deepest and most liquid, and recognizable. The Dow is most recognizable, but until a couple of weeks ago there were no futures and options on the Dow.

**From the Floor:** What if you were bold and tried to create your own artificial option?

**Mr. McKinzie:** For a price anything's possible, but it'll be expensive.

**Mr. Crozier:** The only thing I would add to that is that with respect to designing your own index, people haven't gone that far, but there are designs out there where companies have taken weighted averages of various international indices and "created" their own index that's weighted by various indices. But I think the availability and the cost of the options are the two things that have driven the indices that are used, and the fact that the S&P 500 is so well-known from a marketing point of view.

**From the Floor:** In some of your opening comments you had mentioned sales figures for EIAs were entrusted in sales figures for equity-indexed life products.

**From the Floor:** I think 40–50 million for 1997.

**Mr. Eisenberg:** Yes, there was another question.

**Mr. Paul N. Smalley:** Speaking of the hedging costs, maybe you could comment on the practice of perhaps hedging twice a month for a product that's issued every week or, perhaps more currently, hedging once a week for a product that's issued daily. Pros and cons?

**Mr. Eisenberg:** The question was, How often should you be hedging depending on how often the policy is issued? Does it have to be in sync or not?

**Mr. Crozier:** It really gets to an efficiency question. If you're having a small volume of sales, you're, by definition, wanting to reach some critical mass, and that's why people have allowed their risk to ride until it reaches a certain size, whereupon they will execute a hedge for it. If you can track that exposure, if it's by definition a small exposure, it does not pose a great risk to your company. You are playing catch-up by doing it after the fact. You are somewhat vulnerable to sudden movements. But, again, if the size is small enough, the risk isn't that high. You are going to encounter short-run tracking error catches. What's the price of that tracking error? It's probably in many cases worth the tracking error to save the money to get more efficient hedge put in place. The key, though, is to know where you are and not lose track of what's happened. If the sale took place two or three weeks ago, you're just hedging it. We have dealt with that with some of our clients who have enough money to bother with the hedge right away. We track it, keep in mind, and when the hedges are put in place they take that into account. That's a trade-off that needs to be discussed. What's the risk of the cost going up significantly versus the true risk to you if you have relatively small sales, and it doesn't matter anyway? It's a business judgment issue, and it needs to be worked out on a case-by-case basis, but people are definitely taking that risk today, and I don't think that the events of yesterday and today are going to change that.

**Mr. Michael C. Ward:** Do either of the panelists support option replication as a way to produce a buy-and-hold position for a closed block of business, or is it something that has to be managed on an ongoing basis?

**Mr. McKinzie:** You have a closed block of business. Can you engage in option replication and view it as buy-and-hold? Do you mean that for Type 1 accounting purposes?

**From the Floor:** No, not necessarily.

**Mr. McKinzie:** OK, because I can't really comment on that.

**Mr. Crozier:** The answer is if a replication is set up, it, by definition, involves some role at some point. It's rarely going to be viewed as buy-and-hold. That doesn't mean that you're going to be actively trading it day to day. In fact, you may not trade it for a year. If the product goes out on a closed block basis for several years, you are going to have some trading activity involved. It's not a pure buy-and-hold.

**From the Floor:** So, you don't then term what might be called delta hedging or matching of the Greeks to be an option replication.

**Mr. Crozier:** You can match the Greeks and not replicate. You can match the Greeks and replicate. It's a different issue. It's a question of how you're going to match the Greeks. The difference between a buy-and-hold would be cost certainty. If you buy and hold, there's perfect cost certainty. With replication there is not. But the replications generally match all the Greeks. That's the point of replication.