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#### Session 17

#### Equity-Indexed Products—Financial Issues

**Moderator:** Douglas A. George  
**Panelists:** Kevin F. Leavey  
Barbara L. Snyder  
Francis P. Sabatini

*Equity-indexed products have been popular for about four years. During that period, this product type has provided substantial financial management challenges. This session focuses on the specific challenges presented by equity-indexed products. The panelists discuss how the industry has responded to these challenges. Topics include:*

- *Investment hedging and market volatility*
- *Product modeling*
- *Participation rate competition*
- *Product evolution*
- *GAAP for Derivatives—FAS 133*

*The latest developments affecting the financial management of equity-indexed products are covered. Specific reasons why equity-indexed products have proven to be a financial challenge are also discussed. Finally, how these challenges are being addressed is shared.*

**MR. DOUGLAS A. GEORGE:** We have three good panelists. I'm the moderator and a partner with Avon Consulting Group. Our first speaker will be Kevin Leavey. Kevin is assistant actuary with Keyport Life, where he works in the product development area. He has nine years

experience with annuities and quite a bit with equity-indexed annuities. Second is Barbara Schneider. Barbara is senior vice-president and chief actuary at Jackson National. She's in charge of asset/liability modeling (ALM), financial reporting, product development, reinsurance and compliance. Both Kevin and Barbara will address more the product side of equity-indexed products. Finally, Frank Sabatini will deal more with hedging and the financial issues. Frank is a partner in the Hartford office of Ernst & Young and is national practice leader of ALM. First up is Kevin Leavey.

**MR. KEVIN F. LEVY:** My topic is the evolution of equity-indexed products. Equity-indexed products are an increasing source of life insurer premiums. Equity-indexed annuities brought in about \$4.3 billion of premium in 1998, and equity-indexed life products brought in about \$66 million of premium in 1998. My comments are going to focus on the product evolution of equity-indexed annuities.

I'm going to start with a recap of equity-indexed annuities, what they are, who they're for, and how they work. I'll move on to some changes that we've seen in the last four or more years and how the products have evolved to adapt to those changes. Finally, I'll talk about the influence that equity-indexed annuities have had on the rest of the annuity market.

What are equity-indexed annuities? They're fixed annuities that provide a minimum guarantee, which is equal to or slightly greater than that required by the standard nonforfeiture law. The total return for the annuity is linked to an equity index. There's no investment risk to capital, and, like other deferred annuities, the investment gains are tax deferred. What equity-indexed annuities provide to people is the upside market potential without a downside market risk.

Who do we gear these products towards? They can be geared towards risk adverse savers who are looking for yield greater than that traditionally available with traditional fixed products, or they could be geared towards market investors who are looking for a safety net in their portfolio. Equity-indexed annuities provide to clients the ability to lock in market gains without having to actually leave the market.

How do they work? The total return for equity-indexed annuities is determined by taking the index return determined by a crediting method and multiplying that by a participation rate. The crediting method determines the index increase over the measurement period, and the participation rate defines that portion of the index increase to which the client is entitled.

I want to mention common crediting methods, but common would be a bit of a misnomer in that crediting methods are actually too numerous to count, but they can be categorized into some major groups. Major groups are high-point, point-to-point, and annual reset or annual ratchet. The final item is yield spread. Yield spread is actually a modifier or an adjustment to a crediting method, but I listed it here to maintain consistency with some sales data that I'll be showing you in a few moments.

A high-point crediting method compares the highest anniversary index value to the initial index value to determine the index increase. Participation rates are guaranteed for the term, and the client can lock in gains every year. On a point-to-point crediting method, you compare the last index value in the term to the initial value. The participation rate is guaranteed for the term, but there's no annual lock-in of gains. For an annual reset or annual ratchet type crediting method, the index resets each year. The participation rate may or may not be guaranteed, but again the gains can be locked in annually.

As I mentioned, yield spread is actually a modifier or adjustment to a crediting method, and it changes the dynamic of the pricing on the total return equation in that the participation rate can be pretty much anything you want it to be. It's normally 90% or 100%, and the participation rate is guaranteed. However, what is not guaranteed and what can vary is the actual yield spread off the return. It takes the focus off the participation rate.

Now I want to show you just a very short-term example of how you take a look at these different crediting methods. If you're using a high-point crediting method, you use the highest anniversary value or the 140, and compare it to the 100 initial value to get your 40% return and apply a participation rate. That's your total return for the annuity. For an end point, you'd use the ending index value of 135 compared to the initial value and you'd get a 35% return. Multiply that by a participation rate, and your return for the end point or point-to-point crediting method is \$13,500.

- High-Point Example
  - 140 index high-point
  - 85% Participation rate
  - Growth in index:  $(140 - 100)/100 = 40\%$
  - Return at end of term:  $\$10,000 \times (85\% \times 40\%) = \$3,400$
  - End-of-term value:  $\$10,000 + \$3,400 = \$13,400$
  
- Point-to-Point Example
  - 135 index end-point
  - 100% Participation rate
  - Growth in index:  $(135 - 100)/100 = 35\%$
  - Return at end of term:  $\$10,000 \times (100\% \times 35\%) = \$3,500$
  - End-of-term value:  $\$10,000 + \$3,500 = \$13,500$

An annual reset or annual ratchet method looks at each year individually. In the first year, you have a 15% return over the year. When you look in the second year, the index value has actually gone down. Remember that equity-indexed annuities provide upside potential without a downside risk. The index value or the person's account value doesn't actually go down in the

second year. It actually stays flat. For a yield spread type design, you take the annual reset return and take off a spread of maybe 300–500 basis points.

- Annual Reset Example
  - Index value at end of year one = 115
  - 60% Participation rate
  - Growth in index:  $(115 - 100)/100 = 15\%$
  - Return at end of year one:  $\$10,000 \times (60\% \times 15\%) = \$900$
  - Value at end of year one: \$10,900
  - End-of-term value: \$13,429
  
- Yield Spread Example
  - Index value at end of year one = 115
  - 5.00% Participation rate
  - Growth in index:  $(115 - 100)/100 = 15\%$
  - Return at end of year one:  $\$10,000 \times (15\% - 5\%) = \$1,000$
  - Value at end of year one: \$11,000
  - End-of-term value: \$14,126

In order to make products more competitive, companies modify their crediting methods. These modifiers will adjust the credit method thereby affecting the total return. Modifiers lower the cost of providing the index option, and some examples of modifiers include caps, averaging, and simple interest crediting. Caps can be an annual cap or a cap over the term. Caps will remove the tail risk of the upper volatility, thereby reducing the option price.

You can do averaging in almost a myriad of different ways. You can have daily averaging, monthly averaging, averaging over the last 12 months or the last 24 months, but the averaging will reduce the sensitivity of the option by lowering the computed return of the index. Simple interest crediting will lower the index increase, thereby allowing a higher participation rate.

There are other controls that a company has in order to keep their product competitive. Some of those controls are modifying how long the participation rate will be guaranteed. You may have a term of nine years, and within that nine-year surrender term, you may guarantee the participation rate for three years or two years or one year. Another thing is that the ability to change the participation rate will allow the company to offer a better participation rate down the road in later years if option costs decline.

One of the difficulties of changing the participation rate is that annual hedging can get to be expensive, which makes this process unattractive. Another control the company could use would be using a combination of modifiers, like averaging with a cap, which would make their product as competitive as possible.

What I feel, from a cost standpoint, is when you have \$100 of premium in the door, you must allocate that \$100 of premium, and you have three major categories that you have to cover. You have to cover your minimum guarantee, your commissions, and your expenses. You also have to fund the call option that you're buying for the client. As the financial marketplace changes, these proportions are going to shift, and as these proportions shift, companies are going to modify their products to keep them within what can be referred to as the comfort zone. The comfort zone is the observed tendency of participation rates that strive to be between 70% and 100%.

Can you sell an equity-indexed annuity below a 70% participation rate? You absolutely can. Can you sell it above 100%? You absolutely can, but it's harder, and there are more explanations creating a higher hurdle for the agent to clear in order to close the sale.

We've taken a look at what equity-indexed annuities are, and what I'd like to touch on is some of the changes we've seen in the financial markets and their effect on the product design. I'd like to start by looking at some economic changes over the past several years. Chart 1 shows the return on the S&P 500 since January of 1993. It's no great news to anyone that there has been a tremendous run in the stock market over the past several years. The average annual return over the last six-plus years has been 19%. The average annual return for the 40 years prior to that was only 7%.

Let's focus on July 1995 in Chart 1. As of July 1995, my company, Keyport Life, and Lincoln Benefit Life launched their equity-indexed annuities, Key Index and Savers. Take a look at the returns in the market since that point. The market has really taken off, and the interest in the equity markets have taken off with it. The market increases definitely help to increase equity-indexed annuities' appeal. Granted, it probably would have increased their appeal even more had there been a major correction for their emphasizing the upside potential without downside risk, but I think the overall enthusiasm for the equity market or equity type investments have helped keep equity-indexed annuities as popular as they are.

Let's take a look at some other financial changes (Chart 2). Over the past four or more years, we've seen the general interest rates drop by about 100 basis points. What this does is it increases the amount of premium you need to cover your minimum guarantees. We've also seen tremendous increase in the implied volatility. Implied volatility in 1995 was about 15%. It has gone higher than where it is now, but it's now hovering around 30%. This increase in implied volatility has led to a tremendous increase in option costs, and what further exacerbates that increased cost is the fact that the implied dividend yields have dropped from 2.5% to 1.2%.

How do you allocate \$100 of premium? In 1995, with \$100 of premium, you would have needed \$70 to cover your minimum guarantee, approximately \$7 to cover your commissions and expenses, and that would leave you with \$23 to fund your option cost. Let's assume that to offer 100% participation in the S&P 500, the cost of that option was \$28. In 1995, you got \$23 to fund that option, which would imply a participation rate of around 82%. If we move forward to 1999, we'll see how the allocations have shifted. Due to the drop in the interest rates, you need \$76 to cover your minimum guarantee.

Let's assume, just for argument's sake, that your commissions and expenses have not increased, and that will leave you with \$17 to fund your option costs. You'll have less money in order to purchase the call option. With the tremendous increase in the implied volatility and the decrease in the dividend yield, the cost of the same option has increased by about 30%. To offer 100% participation in the S&P 500, that cost would be \$38, but now you only have \$17 to fund that, which would give you an implied participation rate of around 45%. What you'd expect to see

over time is a decreasing level of participation rates across the industry. Let's take a look at those.

Chart 3 doesn't go as far back as 1995, but if you just look at 1997 on, you'll see that participation rates, in general, have trended downward, then they flattened out, and now they've rebounded a little bit. Why has that happened? There are a number of reasons. Some of them are economic, but another reason is there has been product evolution, and the product evolution that we've seen has shown a shift in crediting method popularity. We're seeing longer surrender charge periods, and we're seeing more use of modifiers. We're seeing a drop in the minimum guarantees and an increasing commission. Companies are offering different indices. I'll be addressing each one of these items separately.

As for the crediting method shift, in 1995 and 1996, the high-point in annual reset methods really governed. Why is that? It's pretty much because the methods were the only games in town. The biggest sellers were the ones that had the high-point annual reset method. What happened in just one year, from 1997 to 1998? Annual resets went from 39% (1997) to 40% (1998). High-point went from 19% in 1997 to 4% in 1998. Point-to-point went from 30% to 26%. There has been a tremendous increase in the amount of premium going to the yield-spread design or a crediting method with a yield-spread-type modifier. Twelve percent of premium went to yield spread design in 1997, and that more than doubled to 30% in 1998. The yield spread design, coupled with an annual reset crediting method, is deemed to be simple to understand and simple to sell, and I think its popularity backs that up.

We're seeing longer surrender charge periods. The initial terms sold in 1995 were five or seven years, and as late as the end of 1997, 62% of equity-indexed annuities had a surrender period of seven years or less, but by the end of 1998, 63% of equity-indexed annuities had a surrender charge period of nine years or longer. Longer surrender charge periods can be used to save money on your minimum guarantees. You can allocate less money to your minimum guarantee if you have a longer surrender charge period, but what a longer surrender charge period will encourage is the desire for higher commissions.

We're seeing more use of modifiers. Sales by averaging contracts have increased from 39% of sales in 1997 to 68% of sales in 1998. The percentage of products that provide only an annual participation rate guarantee has doubled in the past year. We're seeing increasing use of caps, and, as shown before, there has been a tremendous increase in the use of the yield spread.

We're seeing a drop in minimum guarantees. Equity-indexed annuities provide a minimum guarantee, which is equal to or slightly greater than that required by the standard nonforfeiture law. In order to save some money or, I should say, in order to allocate their money in different ways, some of the companies were providing more than what is precisely required by the standard nonforfeiture law. They have backed off a little bit—in some cases all the way down to providing a guarantee, which precisely meets standard nonforfeiture law requirements.

The effect of economic changes is reflected in the decrease in the risk-free rate; we're seeing an increased proportion of premium needed to fund minimum guarantees. The decrease in the risk-free rate has helped option cost slightly, but the increasing volatility and decreasing dividend yields have led to much higher option cost and have really promoted the use of modifiers.

There are other changes that have gone on that are not economic. Some of those changes are marketing. There has been an increase in commissions which has also led to longer surrender charge periods, and more than 50% of current sales are paying a commission, which is greater than 9%. These higher commissions need to be amortized over a longer period. We're also seeing agents and clients preferring the simplicity of annual reset in yield spread designs. When I say *simplicity*, I mean the amount of explanation that is needed in order to close the sale.

Consumer choice is not something that's just in the insurance industry. Throughout all industries, everyone wants to give as much control as possible to the consumer. People want to be able to customize and to have some control over the things that they buy. It's no different in our industry. Companies are offering products that have different crediting methods. Companies are offering products that have different equity indices. Some companies even offer different fixed indices. Even with all the different choices that companies provide, most companies usually stick with or most of their sales come from one product or a flagship type product.

We've seen some regulatory effects. Equity-indexed annuities are extremely complex. It's very time consuming for insurance departments to get their hands around exactly how a particular equity-indexed annuity works, making the approval process more lengthy than a traditional fixed annuity. In fact, one state has actually regulated the annual reset method in that it requires that excess interest must be credited annually. There are a handful of states out there that have mandated minimum participation rates. If your participation rates drop below this level of around 40%, then you can't sell your product in your state.

There has been a lot of work done in the valuation of equity-indexed annuities over the past few years, but it doesn't appear that valuation rules have affected the product design of equity-indexed annuities yet.

We've talked about equity-indexed annuities, what they are, and how they work. I've shown you some of the changes that have gone on in the financial marketplace, and I'd like to finish by talking about the influence that equity-indexed annuities have had on the rest of the annuity market.

Equity-indexed annuities provide upside potential without downside risk, and I think this idea has carried over into the variable annuity marketplace. We're seeing an increase in guarantee living benefits (GMAB). We're seeing guaranteed minimum accumulation benefits (GMIB). In the case of a GMAB, no matter what happens in the marketplace, if the market goes up or down, the insurer guarantees the client will get a return of 4%. For a guaranteed minimum income benefit, the insurer tells the client no matter what happens in the marketplace. When you're ready to retire and ready to annuitize, we'll guarantee that you will have a minimum level of income.

There's a company out there that provides a minimum guarantee on its payout variable annuity. This means that, no matter what happens in the marketplace, your payment will never drop below 85% of the initial payment. The idea of this safety net or the upside potential without a downside risk has really seemed to catch on.

As I mentioned, equity-indexed annuities are an increasing source of life insurer premium. They started off as just 0.4% of the market in 1995 and have grown to be about 3.3% of the market in 1998. I believe 3.3% of the market, in and of itself, isn't that compelling, but for the top five equity-indexed annuity issuers, equity-indexed annuities account for close to a third of their total annuity premium. It's a very important product line to them.

I'd like to end by referring back to the term *the comfort zone*. The comfort zone is the observed tendency of participation rates to be between 70% and 100%. As I mentioned, you can sell below 70%, and you can sell above 100%, but it makes the sale harder. There are more questions that need more explanation, which creates a higher hurdle for the agent to clear in order to close the sale. Why do we have a comfort zone of 70% to 100%? When equity-indexed annuities were launched, the participation rates were in the 80% and 90% range, thereby creating an expectation of what participation rates should be. We're even teaching our actuarial students that participation rates should be between 75% and 125%, because, if we have a participation rate less than 75%, then that leads to concerns that someone else is earning the 25%. Product evolution has occurred in order to push products up towards and into the comfort zone to clear that hurdle and to make the product easier to sell. Barbara Snyder will talk a little more about participation rate competition.

**MS. BARBARA L. SNYDER:** As Kevin has mentioned, I'm going to talk a little bit more about the index participation rate (IPR) and competition. But I want to touch on a few of the issues that Kevin mentioned. Both pieces of this total return formula are very important. Most products use the Standard and Poor's (S&P) 500, which is an index that most people now recognize, particularly those that might be considering buying an equity-indexed annuity. There are companies that offer a few other indexes. However, I think the information that is most used to sell the product, as Kevin has mentioned, is the participation rate. I think that is the primary basis of competition and why you see companies, as Kevin has mentioned, going into that comfort zone.

Kevin has talked about the use of modifiers. These modifiers, as he's pointed out, can adjust crediting rate and total return, but I think that the piece of that presentation that the policyholder

hears is what that amount of participation rate is. What is important is what that policyholder thinks he's hearing because he might not be understanding fully what it means. Kevin has mentioned that companies use modifiers to be more competitive, but by competitive I think this means that the participation rate goes higher. It doesn't necessarily mean that the return to the policyholder is higher. I'll show some examples of that in a few minutes.

Companies control product design, and therefore, they control rates and guarantee periods. They control the modifier combinations. I think companies need to be concerned about what these issues mean in terms of financial impact, and this goes along with hedging and reserving, as well as the policyholders' understanding of what they're buying and the returns that they can expect from the policies that they are buying. This goes back to the changes in product design, the use of modifiers, the different indices, the longer surrender periods, and so forth. As Kevin has pointed out, the increase in surrender charge periods ties to the increase in commissions. In addition, a recent statistic, which ties in with what Kevin has presented but extends that to 1999 is that 61% of sales in 1999 are in products that have a surrender period of ten years or longer. This statistic was published in the most recent edition of the *Index Compendium*, which is a newsletter that's put out on a monthly basis and specifically addresses equity-indexed products.

I do want to say a little bit about the simplicity of the annual reset or yield spread designs. Again, the agent will feel like the sale is easier because he doesn't have to explain the formula that says  $TR$  equals  $I$  times  $PR$ . He doesn't have to go through each of those pieces and explain what they mean. I think it is an easier sale for the agent. The policyholder might think that it's an easier, more understandable design. The concern again is whether the policyholder really understands what that yield spread means.

There's a quote from the *Index Compendium* that I'd like to read to you in this latest edition: "The increasing use of averaging reflects increased cost in the financial markets and the desire of agents to sell participation rates. The typical index annuity sold today will have an annual reset structure using a yield spread design. The carrier will have the ability to reset participation rates each year. The contract has a ten-year surrender-charge period and an agent commission of

9.87%.” And this is on a contract that is usually single premium, and it’s a deferred, fixed annuity, with a 9.87% commission.

I want to illustrate, with the number of products that are sold on the market today, what the modifiers can mean to the return to the policyholder. The purpose is to show the return to the policyholder. I will caveat this by saying, in the interest of proper disclosure, this is for the purpose of comparison. It uses historic index movements, and therefore, calculates hypothetical returns of how the indexed annuity might have performed over recent history and not what actual returns will be in the future. I think it is worthwhile for relative comparisons of different index structures.

The first three products are all point-to-point. I’ve tried to arrange all examples from highest to lowest but not always exactly highest to lowest in terms of product return. Product return means the return to the policyholder as a percentage of cumulative S&P return. The comparable S&P return is calculated as an historic annual return for the term of the contract ending in 1998. For example, on a nine-year product, this would be using S&P return calculated from 1990 to 1998. If you look at the first of these products, it’s a nine-year point-to-point, 52-week average, which is the last year of the product, 95% IPR. The IPR is guaranteed for the term of the product, and the product return to the policyholder is 79% of the index.

As we go on through these examples, we have a point-to-point first, which is a 5% yield spread. There’s an IPR guarantee for the term of the product. The next product is a high watermark; 45% is the IPR, and the product return is 45%. Then there’s an annual reset. This one has the right to change the IPR annually.

The next set are all annual reset products. They have some type of averaging. The first two do work off the IPR, and the third works off of a yield spread. You’ll see that there are some caps and the ability to change IPR each year. The product return on these products is 32% or less. That’s what the policyholder is getting. I would submit that as companies add modifiers to their product to be more competitive, to increase commissions, to get the return that they want in the marketplace, that it could be coming at the expense of the policyholder. I would also suggest that

the policyholder does not understand what averaging means to the return that he's getting and what all of the other modifiers may be doing to the return. The last two are both annual reset with daily averaging with a yield spread and a cap, with 24% and 30% return to the policyholder.

I want to touch briefly on four other financial issues. Frank is going to be talking about hedging in more detail, so I will be brief. The issue for any of our companies that write this business is the ability to effectively and economically hedge the risks in the products. I would submit that this is, at a minimum, extremely difficult to do when you have path-dependent products. The only product (of which there is widespread public knowledge) that failed financially because of pricing and hedging issues was a spread product or a path-dependent product.

Reserving. We're all familiar with Actuarial Guideline 35. I would disagree a little bit with Kevin on one point, and that is that I think the guideline does have the potential to encourage certain designs and products that might not be the best designs with regard to return to policyholders. At a minimum, the short-term guarantees minimize the impact of the Type C valuation rate. I suspect that this was not the intent of the guideline, but you can work the results out with examples on your own.

Proposed cash-value guidelines. This is a very important topic, and I'm surprised that I have found limited knowledge or seen limited reaction to the work that the Innovative Products Work Group is doing on proposed Actuarial Guideline NFZZZ, or the nonforfeiture ZZZ that would go with what is now Actuarial Guideline 35. The Innovative Products Work Group is a subcommittee of the Life and Health Actuarial Task Force of the NAIC. One version of the proposed guideline, if adopted, could eliminate many of the products we sell in the marketplace now. This isn't just my conclusion. It came out of an analysis on the various options for consideration of Guideline NFZZZ.

Under the purpose of protecting policyholders it would, first of all, take away a state's ability to determine what products policyholders are offered in their states. It is not consistent with the treatment of other deferred fixed annuities and could destroy that market if it were extended

backwards to deferred fixed annuities. The IPWG is taking up this issue and is continuing discussion of this issue on October 1 at their meeting in Atlanta that precedes the NAIC meeting.

Finally, there is state action. Kevin mentioned this briefly. There are a few states that are setting up rules so that a company could not offer a viable product in that state. There's one state that we've dealt with that mandates an annual ratchet design with a minimum IPR of 60% in the first year and a minimum of 50% in renewal years. The product is path-dependent. It can't be economically hedged. If we look at what the IPR might be, as indicated on this product, it would be around the 25% level, and the state mandates 60%. Not only is the IPR that might be viable on the product much less, but the whole design presents increased risk to the insurance company, and that increased risk falls, ultimately, back to the policyholder. I think we need to do more work with state insurance departments that don't understand the requirements they are trying to impose. Hopefully no company really wants to do business in a state that would mandate a design that would be so financially disastrous. If they choose to do so, they better hope that people aren't interested in buying it because there are certainly extreme financial situations that could occur if it became a best seller in terms of premium income. This concludes my remarks. Frank will speak more to financial risks and hedging issues.

**MR. FRANCIS P. SABATINI:** We had a conference call before our session, and we all talked about how we're going to allocate our time. I'm going to take a different look at financial issues surrounding equity-indexed annuities. I'll look at it from the perspective of hedging. If you're familiar with the product, you know that if you issue one, odds are you should be hedging at least the index that you're crediting to policyholders.

With the introduction of these products, we've gone into a world of indexed options. Was I an expert in indexed options ten years ago? No. Am I today? I could argue that fact. Managing these options and the option portfolios is a new insurance industry skill set that we're learning. I would not say that we've become experts at it. It's a very difficult, challenging task, and in many cases, we plunged into this environment quickly. We've not always looked at all the issues and covered all the bases or proceeded with the highest degree of confidence. However, we're constrained by the technology. There are a lot of bright people out there that know what we need

to do to get our arms around a lot of the issues surrounding hedging equity-indexed products. The technology just doesn't exist. We're kind of caught a little bit in between, but now that our in-force population grows, it's now in excess of several billion dollars.

We have some nagging questions, that we'll discuss. Is the strategy effective? What does that mean? Is it doing what you intended it to do? Is it covering the liabilities? What were you really trying to accomplish in the first place? Was your goal to completely immunize you from any kind of risk? Is the strategy doing that job? Does the strategy add or destroy value? We'll talk a little bit more about that in a few minutes. Does it enhance or inhibit your ability to compete in the marketplace? It's an interesting question. If you're actively trading your hedge book, are the transaction costs greater than what you've assumed in the pricing? Does the hedge strategy produce an acceptable risk profile? Is the strategy not only effective, but is it optimal?

Let's back up a little bit. If you work for an accounting firm today, you know that one of the fun words is *bifurcate* if you've gone to the *Financial Accounting Standard (FAS 133)* sessions. What has actually happened in terms of hedging in the industry is we bifurcated into one or two approaches, and the first is to take what I would call a static hedging approach. The goal there is to buy options that are mirror images of the liability. If you sell a five-year point-to-point, you go out and buy an option at exactly the right strike price. That is a five-year point-to-point method. You might say, "If I've done that, I'm perfectly hedged, and I'll challenge that in a minute." Or you can implement dynamic hedging. That approach is designed to purchase options that match all or some of the Greeks.

I'm going to define them here. We should all be familiar with the concept of duration and convexity, and the Greeks are just the S&P option market equivalent of duration and convexity. They represent a series of first derivatives to test the change in the price of an option to a change in the underlying change in value for changes in the index, the S&P 500. That's analogous to duration. Gamma is the change in value with respect to the change in Delta, and that's analogous to convexity. Vega is the sensitivity of the change in value to implied volatility. Rho is the sensitivity to changes in risk-free rates, and Beta is the sensitivity to the passage of time.

In a static hedging context, if you bought an option that exactly replicates your liability, then you've hedged the Greeks, and you're done as long as no one dies or lapses. Once they begin to die and lapse, you realize that you're not perfectly hedged, and there's risk. Unless you're able to measure it, you don't know how much. That's true if they die in a hedge. What that may leave you with is just an overhedged position. That's likely to occur, but that has financial implications. If you're interested, it might require some quantification.

In a dynamic hedging context, there are more degrees of freedom. We all occasionally have thought about duration mismatches. You can have Greek mismatches. You don't have to exactly hedge, although that might make sense for equity-indexed products. You don't have to hedge Gamma or any of the other Greeks. There are strategies that exist that allow you to accomplish certain goals in terms of meeting that liability that present you with some risk. I'll illustrate some in a minute.

Let's discuss these two alternatives that have emerged in the market and do a little bit of a comparison by replicating over-the-counter options. It's almost analogous to cash matching or a full immunization, ignoring the lapse and the other decrements. If you're buying over-the-counter options, you're taking on counterparty risk. That's not to be taken too lightly, and if we ignore it, we'll all get excited about it the first time somebody's hedge book isn't worth what he or she thought it was because the counterparty wasn't there to fulfill the other side of the transaction. Over-the-counter options tend to be expensive. You're not dealing in an environment where there's a very efficient market. You're dealing with a select few counterparties who are constantly trying to make as much money off the transaction as they possibly can.

The replicating OTC option strategy tends to disintegrate as the in-force business grows because the basic concept is sell a liability, buy a replicating option, sell a liability, buy a replicating option, sell a liability, buy a replicating option. If somebody dies, what do I do with the option? Can I give it to the new guy? Volatility might have gone up and the cost of the option might have gone up. As more and more people die and lapse, the one-for-one starts to break down, and what has happened in the industry is the companies that started out matching assets to liabilities

have realized that they have got to move to another way to kind of manage that whole program. Of course, in order to keep track of every liability and every option, it requires some recordkeeping. Is there low risk? Arguably, if you're matching up that way, and if you had recognized that you are going to have lapses and deaths, you don't have to buy an option for every liability. If you have the lapse assumptions right, you have a pretty low risk. On the other side of the coin, those options do tend to be more expensive, so you've given something back in either lower profit or a less competitive position. I'm not promoting either one of these. They both have their pros and cons.

Let's look at dynamic hedging. You don't have to hedge out all the risks. You can take an exposure, and you can be comfortable with that exposure if you can get your arms around it in terms of its economic implications. You're more than likely to use exchange-traded options. You'll even be using futures and not even buying call options at all. So there's no counterparty risk. You do need more sophisticated systems and analytics. Look at the difficulty we have calculating duration and convexity. Imagine having to calculate these things. It's not easy. Are we using the right systems? It is not a problem. What about lower cost? You're now working with exchange-traded options. There might be a lower cost. I must qualify that statement, and I'll come back to it in a minute. If you can get it to be lower cost, then it's either more profit or a more competitive position.

Let's go through a mental exercise and pick a product. Let's take an annual reset product and use a replicating strategy. We're going to buy call options. If we didn't have any deaths or lapses, arguably that would be right here at the zero point. We've exactly replicated the liability. We should have no risk. You should be at the zero point. The reality is that we really don't re-price our participation rate to where the option markets would suggest they would be at any time. We need to really be conscious of competitive considerations. We might not reflect the bid as spread, or we're actually purchasing the options relative to what we're assuming in setting our participation rates exactly the way we should be in our pricing and resetting our liability. All of a sudden, we start moving away from that zero point.

Let's throw a cap in on top of the product. We've now introduced something that's called volatility skew. That reflects how the price of an option changes by how far in or out of the money you are. If you forget to reflect that in the liability or, in your liability pricing, that starts moving you down the curve to a point closer to the bottom. That can be fairly significant. Let's say you move to dynamic hedging, and you adopt a strategy. It could be any strategy. You could end up out here, or you can adopt the strategy that focuses just on Delta. For an annual ratchet, that's going to move you out, possibly because of transaction costs or how frequently you're rebalancing the portfolio. If you're rebalancing your hedge book every day to keep the options in line, that becomes more expensive. To the extent that it's not being reselected back in your liability pricing, you start to push away.

If you send a message that says that whatever you're doing with your hedge book needs to get reflected back in how you're setting your liability pricing, that's a very strong message. You can do other things rather than just hedge Delta. Let's hedge Beta. That's going to probably push you up and to the left. So, going through this kind of analytic is extremely important. It helps you understand to what extent your pricing is aligned with what's going on with your hedge book and how much value you're creating or destroying. It's also helping you understand how much risk your hedge program could be producing by not hedging all the Greeks or by not recognizing the fact that in a static strategy you haven't really reflected the fact that you do have things called lapses.

I'll venture a guess. This is my opinion. It's not based on any survey. We're in an evolution. This is still a relatively new product, and the hedge programs that support it are still maturing. They're becoming better and better with time. I would venture to guess that most hedge programs are suboptimal. I also believe that the transaction cost and the rebalancing frequency and the impact it has on the economics of the overall product are more likely to be negative than they are to be positive. There's an argument that could be tested through an economic analysis similar to the one that I just showed you to evaluate the trade-off between whether we have to trade every day? Do our Greeks have to get that much out, and do they have to be brought back in line every day? Can we tolerate some level of exposure on a day-to-day basis and save

transaction costs? Would we be better off? Are we creating more value and not necessarily creating that much more risk?

The unified Greeks is something you probably won't read about in a textbook. It's something that we've developed, and it's a basic concept that, when you calculate the Greeks, you not only calculate them on the options, and particularly the options on the liability, but you calculate them on all the product's elements. That means that when you're managing an equity-indexed product you're buying options. You're also buying bonds. Why not include bonds into the entire calculation of the Greeks?

That's going to have an impact because you start to value the entire liability, including the option, over the entire life of the product, not to the next reset date. If you just took the indexed piece, for example, and you measured the Greeks to the next reset date, you're going to get one answer, but the concept of duration and the concept of any kind of sensitivity value is based on how a contract turns into cash. If you look at an annual reset or a ratchet, in terms of how it changes into cash, you'll see that it's not just one year, it's all subsequent years. Because the way you change your participation rates over time and the correlation with the capital markets and how you value your liability, might cause you to find that you're going to end up with a much different set of Greeks. Then, if you introduce the change in the underlying bond portfolio over time, you're going to get a much different set of values. We will argue, and it depends on the product design, that the true Greek targets, are the ones that consider the entire liability over their entire lifetime.

In the end, the goal is to create value, not destroy it. The key to understanding whether or not your hedge program and how well it's integrated back to your pricing, is creating value or destroying it, is through proper analytics.

**MR. GEORGE:** Our title is financial risks and issues, and we have certainly talked about them in a general sense. What do we see out there, given our experience with our competition and the products that are there? What do we see as some of the major risks? Obviously there have been some companies that have had some financial trouble with this product already. Given that

experience and given what we believe companies are doing, can we be a little bit more direct as to what we see are the major threats to this product financially?

**MR. SABATINI:** I can try to answer that. When you boil it all down, this product isn't any different than any other product. There are a number of ways to mess it up. One is you can mess it up on the asset side, and we've managed to do that with other products, either through overconcentration in a particular asset class and taking a credit risk or through a mismatch of one form or another. Those risk issues are prevalent here. We could use the wrong investment strategy or we could use the wrong hedge strategy. That's common. It's no different for this product than it is for any other product, and the organizations that understand what they're doing and understand the risks that they're taking will survive longer than the ones that don't do it as well.

It's no different than the other markets. We're all trying to compete, and every month or week we need to set the price on our product, and we know where that should be in order to achieve the return objectives and the profitability the company expects for us. We look at the price that our competitor is offering, and we make those finely tuned adjustments to what we're offering. The cumulative effect of those finely tuned adjustments bring us to the realization that, as we look out the back window, we haven't accomplished what we set out to do. That's no different than any other product that we've used. I guess the point I'm making is that the economic issues that surround this product are not unique. They're the same economic issues that surround almost every other product an insurance company could sell. They may look a little different because the product is a little different, and the investment programs to support it are a little different, but the bottom line is they're the same.

**FROM THE FLOOR:** This question is primarily aimed toward Kevin. When you mentioned the yield spread approach, I think you mentioned the spread in terms of 300 and 500 basis points. Was that to achieve a 95% to 100% participation rate? If you add a 100% participation rate, would that spread be used primarily to cover the option cost or cover the option cost plus your profitability component. There's also your guaranteed minimum 3% return there or what would really be the breakdown of that spread?

**MR. LEAVEY:** Are you referring to the breakdown of the 300–500-basis-point spread?

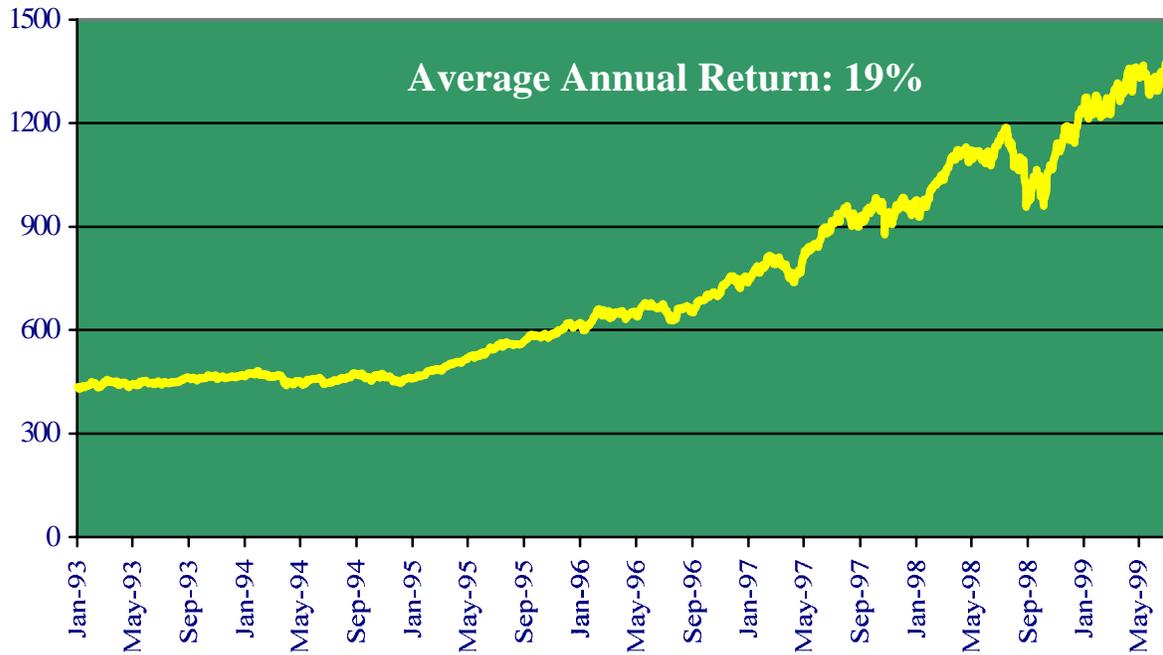
**FROM THE FLOOR:** With a normal deferred annuity, would there be other charges that you're really getting profit components out of where you can play kind of a manipulation game? Would it be primarily in that spread where you're buying your profit component and your option cost, or would it be coming out of various places?

**MR. LEAVEY:** It's a little hard to split it out. The way I understand yield spread is that it is a little more like a traditional fixed annuity where you have your expenses and the cost built into it. What it does, as I mentioned, is it changes the pricing dynamic; instead of lowering your participation rate, and therefore using less money to purchase the option, the participation rate will stay the same. Maybe you'll vary the yield spread. On another type of crediting method that didn't use a yield spread, you'd just be adjusting the participation rate in order to cover all your bases. With the yield spread type design, you can actually adjust both the index increase as well as the participation rate.

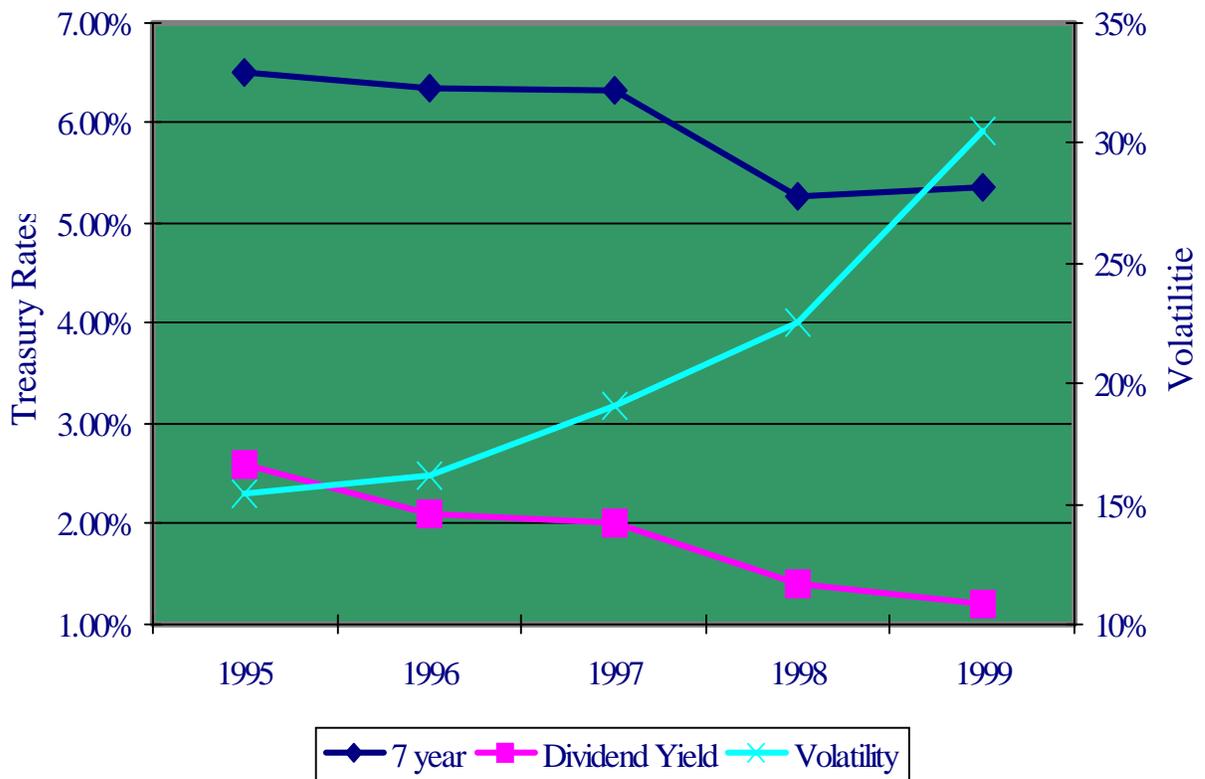
**FROM THE FLOOR:** When the market volatility changes, instead of a change in participation rate, you could absorb it with changing the spread there.

**MR. LEAVEY:** I just pulled out the 300–500 basis points. There are products that have maximum yield spreads of 250 basis points. There are other products out there that go as high as maybe 600 or 700 basis points, but the 300–500 basis points was meant to give you an idea of how to use it.

**CHART 1**  
S&P 500 (1993–1999)



**CHART 2**  
Interest Rates, Dividend Yields and Volatilities



**CHART 3**  
**Industry Participation Rate History**

