

**1996 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

SESSION 30

Equity-Indexed Annuities -- Reserving and Accounting Issues

Lilia M. Sham, Moderator

Michael L. Beeson

Alan R. Downey

John Santosuosso

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

MS. LILIA M. SHAM: We have a very interesting mix of experts as our instructors. We have a company actuary who will address the reserving issues, an accountant who will address the accounting issues, and a consulting actuary who is going to address the cash-flow testing issues.

Let me introduce you to these experts. Alan Downey is assistant vice president and appointed actuary at Keyport Life Insurance Company. Alan is responsible for the actuarial aspects of statutory, GAAP and tax financial reporting at Keyport. Keyport was one of the first companies in the U.S. to launch an equity-indexed annuity product. Alan has some experience that most of us in this room do not have, which is to have gone through a real life year-end valuation process for an equity-indexed annuity product. John Santosuosso is not an actuary, but a CPA. So, obviously, John is more qualified than most of us to address the accounting issues. John is a senior manager at Ernst & Young. His areas of practice include working with life companies in life and annuity reserving, market-value accounting and investment accounting, in particular, the accounting of derivative instruments. Ernst & Young is the auditor for Keyport, and John is on that team. Therefore, John will have some unique experience to share with us on the accounting of equity-indexed annuities.

The third instructor is Mike Beeson, who is a principal at Tillinghast-Towers Perrin and a colleague of mine in Atlanta. Mike has extensive experience in using asset and liability models to price equity-indexed annuity products. He has been instrumental in upgrading our software, and in handling the equity-indexed annuity products. Mike is going to talk about the cash-flow testing issues on these products. Alan will speak first, followed by John and finally, Mike. I would ask all of you to hold your questions until the end of all three presentations. So, without further ado, I'm going to ask Alan to speak first.

MR. ALAN R. DOWNEY: My part of the session will consist of three main parts. First, I will briefly review the major product designs that are currently being marketed for equity-indexed

annuities today. Next, I'll present issues and techniques associated with the reserving of equity-indexed annuities. Finally, I'll present a series of accounting illustrations that are designed to demonstrate the importance of carefully selecting the accounting basis for both your assets and liabilities. I was originally also going to make some remarks with respect to cash-flow testing issues, but in the interest of leaving plenty of time for questions later on at the end, we'll leave that part in Mike's capable hands.

Four major classes of equity-indexed annuity product designs are currently being marketed today. The Ratchet design involves an annual reset of the equity index. Under the European, or point-to-point design, index credits are assigned only at the end of the policy term and are based on the index value at the end of the term. The Asian design, or so-called point-to-point average design, is similar to the European design in that the index credits are assigned only at the end of the policy term. However, the basis for determining those credits is an average of the index over some part of the term, typically the last one to two years of the term. Finally, the high water mark, or the discrete look-back design permits a lock-in of index credit to each anniversary prior to the end of the term. Each of these products can also be subject to vesting schedules where only part of the index credits may be available upon surrender of the policy. Surrender charges and front-end loads may also be applicable.

One of the important implications in choosing an equity-indexed annuity design is the complexity involved in determining the value of the equity-index options from both an asset and a liability perspective. The European design is, perhaps, the easiest to work with, as this design is consistent with relatively simple option-pricing models such as the Black Scholes model. The high water mark design by contrast is extremely complicated to work with, because only stochastic methods such as Monte Carlo simulation can be used to adequately value options under this design.

Now, I'd like to move on to the area of reserving issues. I preface the introduction of this topic by saying that at this point there is relatively little authoritative guidance on how equity-indexed annuity reserves should be determined, particularly for statutory and tax reserves. However, I would expect

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

this situation to change very rapidly within the next two to three years, as the proliferation of equity-indexed products will mandate responses from state legislators and the IRS.

First, I will present several potential statutory reserving approaches. This list of approaches is not necessarily intended to be all inclusive, and I'm sure there are other valid approaches out there that could be used. The first approach is the minimum guaranteed value. This value is the amount that would be paid to the contractholder upon surrender of the contract. Any index credits that have vested as of the valuation date should be included in this value. As with other deferred annuities, it is possible that this value may exceed the Commissioner's Annuity Reserve Valuation Method (CARVM) reserve, and of course, we haven't yet defined what the CARVM reserve is, at least for purposes of this presentation. The minimum guaranteed value may, in fact, not be an adequate reserve basis due to any of the following reasons:

- The assets may include values for the equity-index options which are not being considered in the reserve liability.
- The CARVM reserves would usually exceed the minimum guaranteed value, in which case you would use the CARVM reserve.
- The reserve may not be adequate in light of your normal cash-flow testing process.

Next we'll take a look at CARVM. First, we need to try to answer the question as to whether CARVM actually applies to equity-indexed annuity contracts. In order to do so we need to look at the definition of CARVM in the Standard Valuation Law. In the Standard Valuation Law, CARVM applies to all individual annuity and pure endowment contracts. It excludes group contracts and some employer retirement plans. Thus, unless you decide you're going to market a group or an employer retirement plan, it appears that CARVM does apply to these types of annuities. CARVM also states that guaranteed benefits be projected to the end of the policy year, and then discounted to the valuation date at the statutory valuation rate. To the extent you have any locked-in vested index credits, you should reflect those credits in the projection of your guaranteed values going forward that you're going to discount under CARVM. You will also need to consider the impact of Actuarial Guideline XXXIII, which has been the topic of several sessions at the symposium.

CARVM is the minimum reserve standard required by the Standard Valuation Law, and thus, it's the minimum standard required by the states. However, the CARVM reserve may not be adequate, at least in the context that I've described it, because of any of the following reasons, which are very much the same reasons that the minimum guaranteed value may not be adequate:

- First, the assets may include values for the equity-index options that are not being considered in the reserve liability.
- Second, the minimum guaranteed value may exceed the CARVM reserve, and thus you will have to use the minimum guaranteed value.
- Finally, again, the reserve may simply not be adequate in light of your cash-flow testing.

The next potential methodology is the minimum guaranteed value (MGV) plus the amortized option cost. This approach does not include consideration of the equity-index value on the valuation date, although you could possibly consider that, and I'll describe that in a moment. As long as the assets do not consider the intrinsic value of the options on the valuation date, your assets and liabilities should be on a relatively consistent level. Implicit in the assumption that the amortized cost value of the options is at the appropriate reserve adjustment is the condition that the options are, in fact, appropriate hedges for the liabilities. If the options are not appropriate, then you'll have to consider other methodologies to derive the equity-index portion of the reserve, and adding the amortized cost value of the options to the liabilities is probably not an appropriate thing to do. You also might consider modifying this approach by including the intrinsic value, as I mentioned before, of the options with your assets, while considering the equity-indexed value for your liabilities as of the valuation date.

The interest-indexed annuity contracts model regulation essentially requires that CARVM be used with future projected interest guaranteed rates being equal to the statutory valuation rate. This model regulation has not been adopted in any states today, and there also may be some debate as to whether or not this regulation even applies to equity-indexed annuities. This regulation pre-dated equity-indexed annuities, and thus, you might take the position that it really doesn't apply. However, a few states, and I know Minnesota is one of them, have adopted the filing requirement section of this model regulation for equity-indexed annuity filing. I know that's happened at my company.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

Personally, I don't believe that this model regulation should carry very much weight in determining equity-indexed annuity reserve methodologies, but it does exist. There is a possibility that regulators might look at this and say, well, let's look at this and try to apply it. And, you should be aware of it in spite of the fact that it currently hasn't been adopted.

The next approach involves what I would call an approximation of the market value of the equity-indexed annuity liability. This value is calculated by adding the market value of the call options to the minimum guaranteed value. You might also use as a proxy to the market value of the option assets, the so-called fair value of these assets, which can be calculated using an option pricing model such as Black Scholes. A mismatch in terms of the option-adjusted durations of the assets versus your liabilities will have an impact on the incidence of profits in your financial statements. You should also consider any potential mismatch of the option assets and the equity-indexed portion of your liabilities. A large mismatch may indicate excessive hedging risk, and possible reserve inadequacies from a cash-flow testing perspective. It is also very important to remember that the option assets will need to be valued at market, using this approach, or you will have substantial earnings and surplus fluctuations that go beyond those of normal statutory accounting.

The next model is a model in which you might attempt to develop statutory reserves using a stochastic approach, or a cash-flow testing type of approach. Using this approach requires, among other things, cash-flow testing assumptions, but it also requires modeling the value of the equity-index option using an option-pricing model such as Black Scholes. This is a very complex approach to perform, although, for cash-flow testing purposes, I suppose you are going to have to do it. It's probably best suited for determining, on a periodic basis, your reserve adequacy for a particular equity-indexed line of business.

Let's now move on to the topic of GAAP reserves. Typically GAAP benefit reserves under *FAS 97* are defined as the account value, before the application of surrender or other policy charges. For an equity-indexed annuity product, there are two basic approaches that may be used. Under the book-value approach, the initial GAAP reserve is equal to the single premium. This value will accrue to

the minimum guaranteed value at the end of the term, and then any increases in the equity index will be reflected in the reserves only if the intrinsic value of the call option is included in the assets. Under the market-value approach, the minimum guaranteed value at issue projected to the end of the term is discounted using an asset portfolio yield, less a spread for profit and amortization of acquisition expenses. In addition, the market value or fair value of the options should also be reflected in the GAAP reserve.

The consistency of the asset and liability accounting basis cannot be overemphasized. If you use the book-value approach for your assets, while using a market-value approach for your liabilities, or vice versa, it's going to result in substantial earnings and surplus fluctuations, and you certainly don't want that. I will return to this issue of consistency later when I present the accounting illustrations. Finally, I'll briefly touch on the fact that you will need to consider the implications of the accounting method you use on the amortization of acquisition expenses under *FAS 97* and *FAS 115*.

Moving on to tax reserves, the tax law defines CARVM as the prescribed method. Current or projected future levels of the equity index probably at this point would not be allowed explicitly as part of the tax reserve, although, quite frankly, there are potentially different interpretations of CARVM that might include such projections. However, it does appear you may be able to qualify transactions involving the call options as hedging transactions and thus take a deduction to offset the option income. I'm going to let John discuss that later in his part of the presentation.

Other reserving considerations include market-value adjustment features, the Securities and Exchange Commission (SEC) registration status of your product, or whether or not you're going to put this product in a separate account or a general account. Then, of course, there's cash-flow testing or asset-adequacy analysis. With respect to market-value adjusted (MVA) products, the major regulatory reference points are the Modified Guaranteed Annuity Model Regulation, that actually provides very little in the way of guidance for reserves and has been adopted in only about five or six states at this point. Obviously, the registration status on the product may have an impact on whether or not you want to use book-value or market-value accounting. Finally, cash-flow testing, of course, is always a consideration. Mike will expound upon that later on in the session.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

The accounting illustrations I'm about to present were based on a Type A product, which assumes that no withdrawals are permitted before the end of the term. Obviously a Type A product does not lend itself particularly well to a cash-flow testing analysis, so Mike has, for purposes of his presentation, assumed a Type C product.

Finally, I'd like to illustrate the importance of making sure that your assets and liabilities are valued on a consistent basis. I prepared some tables that project balance sheets from issue to the end of five years.

Table 1 is based on a market-value approach for both assets and liabilities. You'll note the smooth progression of surplus and change in surplus over the five-year period.

TABLE 1
Simplified Product -- Accounting Illustrations
Market Value GAAP Balance Sheet

	Issue	Year 1	Year 2	Year 3	Year 4	Year 5
Bonds	\$72,911	\$78,743	\$85,043	\$91,846	\$99,194	\$107,130
Call Options	22,089	24,788	27,932	31,707	36,476	42,598
DPAC	5,000	4,740	4,296	3,397	1,985	0
Total Assets	\$100,000	\$108,271	\$117,271	\$126,950	\$137,655	\$149,728
Benefit Reserve	\$100,000	\$107,856	\$116,377	\$125,505	\$135,580	\$146,933
Surplus	0	\$415	\$894	\$1,445	\$2,075	\$2,795
Change in Surplus	0	\$415	\$479	\$551	\$630	\$720

Table 2 is based on a book-value approach, and again, you have a relatively smooth progression of surplus and changes in surplus over the five-year period.

TABLE 2
Simplified Product -- Accounting Illustrations
Book Value GAAP Balance Sheet

	Issue	Year 1	Year 2	Year 3	Year 4	Year 5
Bonds	\$72,911	\$78,743	\$85,043	\$91,846	\$99,194	\$107,130
Call Options	22,089	21,337	25,559	30,472	36,132	42,598
DPAC	5,000	4,740	4,296	3,397	1,985	0
Total Assets	\$100,000	\$104,821	\$114,898	\$125,716	\$137,312	\$149,728
Benefit Reserve	\$100,000	\$104,518	\$114,017	\$124,215	\$135,167	\$146,933
Surplus	0	\$303	\$881	\$1,501	\$2,144	\$2,795
Change in Surplus	0	\$303	\$578	\$620	\$643	\$751

Now let's see what happens if you decide to value the assets at market, but the liabilities at book value (Table 3). As you can see, you have a huge gain in the first year, and then you have progressive losses for the next three years, and then a slight gain at the end of the fifth year. This pattern of earnings, particularly for GAAP, is probably not something that is acceptable.

In conclusion, I'd like to review some of the most important considerations pertaining to reserving equity-indexed annuities. First, your product design selection will have an effect on the complexity involved in determining values of the equity-indexed options. There is still a considerable lack of regulatory guidance on this product, and you may need to convince your external auditors, state regulators and the IRS of your positions. Consistency of asset and liability valuation bases is critical to minimize large earnings and surplus fluctuations. Cash-flow testing or asset adequacy analysis is obviously a very important consideration.

Finally, you really need to consider the potential tax reserve impact of the product. And this is something that, I think in a lot of cases, has been ignored or perhaps, touched upon very lightly by people and even by regulators in drafting regulations.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

TABLE 3
Simplified Product -- Accounting Illustrations
GAAP Balance Sheet - Assets at Market, Reserves at Book

	Issue	Year 1	Year 2	Year 3	Year 4	Year 5
Bonds	\$72,911	\$78,743	\$85,043	\$91,846	\$99,194	\$107,130
Call Options	22,089	24,788	27,932	31,707	36,476	42,598
DPAC	5,000	4,740	4,296	3,397	1,985	0
Total Assets	\$100,000	\$108,271	\$117,271	\$126,950	\$137,655	\$149,728
Benefit Reserve	\$100,000	\$104,518	\$114,017	\$124,215	\$135,167	\$146,933
Surplus	0	\$3,753	\$3,254	\$2,735	\$2,488	\$2,795
Change in Surplus	0	\$3,753	\$(499)	\$(519)	\$(247)	\$307

MR. JOHN SANTOSUOSSO: While I was preparing for this presentation I was reminded of a story that a partner in our office once told me. The story centered around a debate that a doctor, a civil engineer and a FASB staff accountant were having. The three were debating over which of their respective professions represented the world's oldest profession. The doctor argued that when God created human kind, He took a rib from Adam and created Eve, and clearly that's a medical procedure and that indicates that the medical profession is the world's oldest profession. To that the civil engineer said, "Hold on a second, Doc. Prior to creating human kind remember that God created our universe out of a state of chaos," to which the FASB staff accountant reported, "Who do you think created the chaos?"

Not that I think that there's a large degree of chaos surrounding the accounting for equity-indexed annuity products, but certainly, as Alan indicated, it's very important to give due consideration to the various accounting bases that you're using for the product and the results those bases are going to have on your financial statement.

My part of the presentation is really going to focus more on the asset side, which is supporting your equity-indexed annuity product. And as I walk through it, a common theme is a theme that Alan first brought up, that I will mention as well. I think Mike will also talk about it and that is the attempt to achieve accounting symmetry throughout the process as you look at your equity-indexed annuity product. It's critical to coordinate your asset and liability valuations lest you end up in a situation where you do have earning patterns that you certainly didn't anticipate. Second, you need to develop models that will help you stress test what is actually occurring in the environment around you. As we are all aware, in 1995 the Standard & Poor's 500 index rose above 37.5%, so that's something that you need to be aware of as you look to get into this type of a product. Finally, continuing the trend that Alan mentioned, it kind of puts us in a good position because there is really no definitive right answer.

The accounting surrounding equity-indexed annuities and the assets that support those products continue to emerge. As you actuaries look at the product and we accountants look at the product, there is a very good chance that the accounting that we know today may actually change and the results that you're anticipating today may actually change, as well. In addition, new authoritative guidance is highly possible and we're already seeing that. One of the things that we'll talk about is the FASB's exposure draft on derivatives. Alan ran you through some of the many product designs that are out there as each of your companies attempts to differentiate your equity-indexed annuity product. Because of all those different designs and considerations that go along with the different products, it's very difficult to come up with one universal accounting model that will work across the industry. So, each situation we're finding is a little bit unique in that way, and companies have to look at their specific product in the accounting for that product.

In terms of looking at a quick anatomy of an equity-indexed annuity product, Alan focused you a little bit on the liability. The most common investment strategy to date that we're seeing is companies are going out and taking the premium at issue and investing that premium really to provide for the future benefits under the product. Namely, companies are going out, we are finding, and purchasing zero-coupon bonds to provide for the minimum guarantee under the Standard Nonforfeiture Law (SNFL). In addition, the most popular investment strategy that we've seen is that companies are going out and

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

buying call options on the S&P 500 index to provide for the index-linked return at maturity. Finally, a certain amount of the premium will go to acquisition expenses.

Clearly the option of purchasing S&P options is the most popular approach that we are seeing. What I thought would make sense is for me to cover three other approaches in addition to that so that we can highlight how important it is from an accounting standpoint, and so we're aware of what happens on the asset side and the liability side. These three options aren't necessarily as popular, and certainly, in some cases we haven't seen these used at all, but I thought I'd mention it just so we can illustrate the accounting.

The first option is, again, to purchase a fixed-income security to provide for the minimum guarantee with the remaining funds used to purchase equities and securities. Those securities are meant to replicate the S&P 500 index. Companies would also go out at that point and purchase put options on the S&P 500 to provide for downside protection. The second strategy would be to enter into an interest rate swap, where you would swap an existing fixed stream for a variable stream tied to the S&P 500 index. And then, finally, a strategy may be to enter into a structured note arrangement that has both a guaranteed portion and a contingent portion to provide for the equity-indexed annuity liability. I'm not going to spend a whole lot of time talking about the S&P 500 options or the hedging instruments. Certainly you can talk to your investment folks and acquire these options either through exchanges or over the counter. There are costs associated with each. Certainly we are seeing the over-the-counter swaps being a little bit more exotic, and being more expensive.

Next, we're going to move right into the accounting now using the four examples that I've cited. First of all, as I said, the fixed-income security is meant to provide for the minimum guarantee under the SNFL. Under statutory accounting for that fixed-income security, that security would be held at amortized cost with interest income amortization, a premium discount recorded in current operations. Because that particular instrument is really meant to provide for the minimum guarantee, you get good accounting symmetry because you are recording, essentially, the interest income in operations, as well as the change in your minimum reserve.

1996 VALUATION ACTUARY SYMPOSIUM

Equities, on the flip side, are held at the NAIC market values, with changes in that market value going through surplus. So to the extent that you are entering into a strategy that includes equity, changes in that equity value will be flowing through surplus, while you may have increases to your equity-indexed annuity liability flowing through operations. And that's a case where you may not achieve the accounting symmetry that you're looking for.

Derivative instruments for statutory and for GAAP generally follow the item being hedged prior to termination. That is, if the derivative is hedging in amortized cost items, it's generally carried at amortized cost. If it's hedging an item carried at fair value, it's carried at fair value. After termination, the gain or loss at termination is rolled into the basis of the item being hedged. The key question with respect to your derivative accounting is, what exactly are you hedging? Clearly in the equity portfolio example that I gave where companies would go out and enter into put options on the S&P 500, the puts are meant to hedge the equity securities, or the investment. We would argue that, depending on how it is you've set up your strategy, if you have S&P 500 options on the asset side to back the index-linked return, one could argue, essentially is it a fair value type item and, therefore, can you carry the S&P 500 option at fair value? That would provide you with the symmetry that you need. So you really need to look at what it is that you're hedging. Set your position on what it is that you're hedging and then determine the accounting that way.

For structured notes, at this point, there's not a whole lot of guidance. What we're seeing out there from a statutory standpoint is that folks who are accruing the guaranteed portion of a structured note and concurrently the contingent portion being deferred, essentially, until it is actually received. So, again, here's a situation where you have a structured note strategy to support your equity-indexed annuity option. You may be recording an index related value on the liability side for statutory purposes that you can't capture on the asset side. Again, you would not have accounting symmetry there. For separate accounts, assets and liabilities are carried at market value. Some states provide that if a liability for guaranteed benefits is provided in the separate account, then a portion of the assets that support those liabilities should be carried as if they were in the general account, which for bonds would be amortized cost. So, again, that's a consideration that you need to make if you have this type of a product in the separate accounts.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

Let's shift over to GAAP. I think clearly we're seeing that there's more guidance on the GAAP side than there is on the statutory side. Many of you are aware of FASB's issuance of the *FAS 115* and what that means for your company. Folks have to classify their investment portfolios of the debt and equity securities into one of three categories: held-to-maturity, available-for-sale, or trading, with differing income recognition depending on which category those assets are classified in. The fixed-income security that we've indicated would provide for the minimum guarantee under the SNFL. Chances are you're going to look at that security and try to make a determination and you're going to carry that. It probably does not make sense to put that in a held-to-maturity bucket because, if you have to provide for surrenders to this particular product, you want to be able to get to that cash. Similarly, if you put it in a trading account, the unrealized gains and losses would be recognized in earnings currently. And that may or may not match up with your strategy on the liability side. So, that's an important consideration. Finally, if you classify that asset in available for sale, changes in the fair value of that asset would flow through a separate component of equity. On equities, we would have to take a similar approach. You can determine whether you want to classify those as trading or available for sale. Again, if it's in available for sale, all the changes in fair value go through a separate component of equity. So if this is the strategy that you're using to provide your index-linked return, and you've recognized the index-linked return on the liability side, you may not achieve accounting symmetry in your income statement.

For derivative instruments statutory accounting practices and GAAP are similar. Again, hedging items are carried at amortized cost. I think the key question that we have to ask here is what exactly are we hedging? We must move from that standpoint and determine how you're going to account for the hedges. A structured note is similar to statutory on the GAAP side. We are seeing folks attempt to take a *FAS 91* yield-to-maturity approach, as well; and then separate accounts are carried at fair value again, unless guaranteed investment returns exist, at which point you would follow the accounting of *FAS 60* and *FAS 115*. We think from a separate account standpoint, if you think about the equity-indexed annuity product, the significant return associated with this product is rarely expected to come from the S&P index or the index-linked value. As a result, I think we could make an argument that the liability is much more fair-value related than amortized-cost related. Therefore,

1996 VALUATION ACTUARY SYMPOSIUM

marking changes in your hedging item through income, along with changes in your liability would achieve the accounting symmetry.

Existing GAAP guidance that's out includes *FAS 115*, which we've talked about. The current hedging model is defined in *FAS 52* and *FAS 80*, along with a host of opinions issued by the Emerging Issues Task Force (EITF). Currently, under *FAS 80*, if you do have a risk that exposes the company and you enter into a hedging transaction, and that hedging transaction will minimize that risk and you designate it as a risk, you can defer those gains and losses. Or there's option accounting. We talked about the S&P call option being the most popular investment strategy. Unfortunately for us, option accounting isn't defined in GAAP. Currently what we do is look to accounting by analogies, *FAS 52* and *FAS 80*, as well as an EITF statement that was issued by the AICPA back in 1986 that outlined the accounting options. The AICPA issues paper has evolved into the practice that we're seeing by a lot of companies.

Finally, there is a piece of existing literature that we think fits nicely with the equity-indexed annuity product, and that is the EITF, Opinion 8628. Essentially, the opinion issued here dealt with debt obligations that had both guaranteed and index-related contingent payments. FASB ruled that as the index increases relative to the contingent portion of the security, that a liability should be established at the valuation date. Furthermore, the indexed increase is not expected to change beyond the valuation date. Essentially you have a situation where your S&P index has increased, and you would record that increase as a contingent liability, which supports some of the argument that Alan was making a moment ago on the liability side from a GAAP standpoint.

Let's talk briefly about option accounting as contained in the issues paper. Essentially you are going to pay an option premium at acquisition, and that premium will have two components, namely the intrinsic value and the time value. The intrinsic value is simply the amount at which the market price exceeds your current strike price. If you do have intrinsic value your option is said to be in the money. The difference between what you then paid in the intrinsic value is what's referred to as time value. So, there's two real components from an accounting standpoint related to the options. The time value portion of the option is amortized over the term of the option. That's a fixed cost that's

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

amortized. The intrinsic value, obviously, represents the changes in the S&P 500 index. Again, the accounting symmetry, you need to take a look at how you're recording the intrinsic value on the liability side and then try to make a determination of whether that makes any sense on the asset side.

Tax accounting for hedges is, frankly, a complicated area, and I guess I would advise all of you to get your tax investment legal counsel involved as early as possible. We have some experts in the office that focus really on tax accounting for hedges. We joke around, and we say that we keep them in a mayonnaise jar in the office and we don't let them out to see our clients. The regulations in this area are very complex. They are relatively new. Unfortunately for us, there is no real interpretative guidance to assist us in applying those regulations to equity-indexed annuity products.

It is important to look at the qualifications from a tax standpoint as they are related to your assets; frankly, if you qualify, you get relief from the loss deferral rules. The big qualification, though, and the thing to consider is in order to qualify as a tax hedge, the item being hedged must be ordinary in nature. So, it has to be a liability or a noncapital asset. And that's why using structured notes as an investment alternative is difficult under the tax hedging laws because a portion of that is a capital asset, and as a result it will not qualify. So, the big test is to make sure as you develop your thought process that you're hedging an ordinary asset and liability. Now that's the existing statutory and GAAP guidance. The FASB, as many of you are probably aware, in 1986, undertook its financial instruments project and many statements have been issued to date related to that project.

There is a fairly controversial statement related to accounting for derivative instruments. We would urge all of you to take a look at that exposure draft, and to the extent that you can, get some responses back to FASB by the common deadline of October 11, 1996. If adopted, this statement will be effective for 1998, although they say early adoption is permitted. I'm not sure anyone is going to be in a position to adopt early, depending on how long it takes to go through the exposure process.

In issuing this derivative proposal, FASB made four fundamental decisions. First, and foremost, they argued, unlike what we currently see, the derivatives represent actual assets and liabilities and,

therefore, should be reflected in the financial statements of the entity. Second, they argued that only assets and liabilities should be reflected in the assets of an entity, or in the financial statement of an entity, and the assets and liabilities in that case are really defined by the FASB concept statements. What FASB was doing was attacking the current *FAS 80* hedge model where you would defer gains and losses to the basis of the asset being hedged. FASB really came out and said deferred gains and losses don't really represent assets and liabilities. As a result you shouldn't be providing for those in your balance sheet or in your financial statements. What they later came out and said is that fair value is the most relevant measure for financial instruments, and it's the only measure for derivative assets. All derivatives will be carried at their fair value. FASB then said, that's a little bold. There is special accounting provided for certain hedge situations, and we'll talk about that as well. It's uncanny how many times in the exposure draft FASB comes out and says fair value is the preferred treatment. It sounds like it's a matter of time before they move in that direction.

Now, the special accounting that I referred to applies to essentially the hedgeable risks or the hedgeable risk that arises. You have risk of future cash flow. Under *FAS 80* this was referred to as an anticipated transaction. What FASB said is, if you have a derivative that hedges future cash flows, what we'd like to see you do is actually record the gains and losses -- the changes in the fair value of the derivative. We want you to warehouse those in equity until the proposed actual occurrence of the anticipated transaction. So changes in the gains and losses in the derivatives related to an anticipated transaction are warehoused in equity. Kind of like the available-for-sale approach in the *FAS 115*.

The second approach is, if you're hedging, use a derivative approach to hedge value risks, fair values of existing assets, liabilities or firm commitments. What FASB said here is that changes in the fair value of the derivative should be recognized in earnings. And the offsetting changes in the hedged item, the existing asset liability, should also be recognized in earnings up to the amount of the derivative change. If you had changes in the fair value of the hedged item above and beyond what you saw in the derivative side, you do not record that. Finally, a provision that doesn't really apply here is some changes in the way that the foreign subsidiaries, net investment and foreign subsidiaries are handled. It really extends *FAS 52*.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

In terms of where we stand looking at the exposure status, I guess our firm, over the long haul, will support the whole exposure draft. We certainly think that there are some good things in there. One of our beefs is that we like the current hedge model. We think that users of your financial statements understand the current hedge models. So to make a drastic change at this time may not be beneficial to the ultimate users. As Alan indicated, I'm not going to run through these. There are other considerations that you need to make before venturing into the equity-indexed annuity product market. If you have any questions on any of them, we'll certainly take them at that time.

Alan did a nice job of summarizing the accounting illustrations. I put together a quick synopsis. I'll discuss a quick summary income statement. Table 4 is the year-one income statement under GAAP and statutory accounting principles, and then a balance sheet follows in Table 5. You can see that we tried to achieve accounting symmetry in this income statement. The option change in value, the intrinsic change in value is recognized in operations, but at the same time, you're seeing that below in the reserve in interest credited. So, those were offsetting amounts. So really what you're left with from a GAAP income statement standpoint is back amortization. The investment income on your fixed-income security and then the change in the reserve related to the minimum guarantee. The same holds true for statutory accounting, as well. It's a different amount, but you do see the accounting symmetry that has been achieved. The interest credited portion really represents the difference between amortization and the option, and the intrinsic value in that option. And that offsets the full interest credited, so you are really left with investment income and change in reserves related to the minimum guarantee.

The balance sheet at year one would look like Table 5. We talked about the bonds, and the fixed-income security is at \$78,743 and you have your options there. That represents your time value component of option, plus the intrinsic value, deferred acquisition cost (DAC) obviously, and then your reserves are \$104,334, which reflects a proxy for a change in what the S&P 500 index was. At this point I think we're going to turn it to Mike to cover cash-flow testing.

TABLE 4
Accounting Illustration -- Year-One Income Statement

	GAAP	SAP
Option - Change in Value	\$3,482	\$3,482
Option Amort. - Time Value	(4,417)	(4,417)
Investment Income	5,832	5,832
Change in Reserve	(852)	(5,081)
Interest Credited	(3,482)	935
DAC Amortization	(264)	
Net Income	299	752

() = Decrease to income

TABLE 5
Accounting Illustration -- Year-One Balance Sheet

Assets		Liabilities	
Bonds	\$78,743	Reserves	\$104,334
Options	21,154		
DAC	4,736	Surplus	299
Total	\$104,663	Total	\$104,633

MR. MICHAEL BEESON: I'm going to focus on cash-flow testing issues and asset adequacy analysis. If I'm going to sign a statement that says my examination considered the need for cash-flow testing, and that the reserves make good and sufficient provision for unmatured obligations, exactly what is it I need to consider in order to feel comfortable signing that statement? I will analyze four different sources of risk: the equity growth rates, termination rates, interest rate changes, and disintermediation. Rather than start off by telling you what kind of assumptions you might want to use, I'm going to take the illustration that Alan and John were working with and run through a few

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

projections. This should give you an idea of how sensitive the results are to different assumptions. Then I'll talk about how we might set some of these assumptions.

Let's recall the details of the example. It was a five-year point-to-point European option, where the policyholder's fund increases if the index increases over the five-year period. Using the asset strategy that John had outlined, we're buying a call option, where the notional amount of the call matches the premium times the participation rate. The rest of the money is allocated to fixed-income assets, in particular a zero-coupon bond. The method that sets the notional amount equal to the premium times participation rate, without any regard for potential decrements, is called exact hedging. There's another method which is called modified hedging. With modified hedging, we consider what the potential decrements would be and buy fewer call options so that we match only the number of persisting policyholders at index maturity. That's actually an important assumption because what we will see is that, if the projection termination rates match the termination rates that you use in setting your hedging strategy, you're going to be in pretty good shape. If not, we may not have adequately hedged the risk.

We're first going to look at the case where we are exactly hedged (Table 6). We will assume zero termination rates for both projection assumptions and hedging strategy assumptions, and we'll look at two cases, one with an 8% annual equity growth and the other with 0% annual equity growth. So, we're looking at both an up market and a down market. In one case, we have a payout from the call options, and in the other case, we don't.

Let me explain this exhibit. The first item, surrender benefit, is just for informational purposes. It will help us compare the magnitude of withdrawals from one case to the next. The sum of the next two rows, the bond maturity and the option payout, represents the accumulated value of the assets that we're buying in the different scenarios. The row labeled liability maturity represents the accumulated liability value at index maturity. We see from this case that whether we have a good equity index increase, or none at all, we get the same amounts of profits. This demonstrates that our hedge is working.

TABLE 6
Base Case Projections

	8% Growth	0% Growth
Surrender Benefit	0	0
Bond Maturity	\$107,130	\$107,130
Option Payout	42598	0
Liability Maturity	<u>146,933</u>	<u>104,335</u>
Profit	\$2,795	\$2,795

Now what happens if our terminations don't follow our hedging strategy? We still have the exact hedging strategy on the asset side, but now we have annual lapse rates of 4% for the first four years (Table 7). The result is that we essentially have bought more call options than we really need. So in an up market, we're going to do pretty well, but in a down market we've spent more on the call options than we had to. Here are the projection results. We see the profits fluctuate substantially, but fortunately, they are still positive.

The next case we'll look at is what happens if we think that terminations will be nonzero, and we use a modified hedging strategy to reflect that (Table 8). We assume 4% annual withdrawals for the first four years. In setting my hedging strategy, that means I have to buy a smaller notional amount of call option with a proportional reduction in the option cost. That leaves more money to be invested in

TABLE 7
4% Annual Lapses

	8% Growth	0% Growth
Surrender Benefit	\$14,584	\$14,584
Bond Maturity	89,366	89,366
Option Payout	42,598	0
Liability Maturity	124,797	88,616
Profit	\$7,167	\$750

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

a zero-coupon bond. I ran through the same two scenarios for equity growth, again using the 4% assumed projection withdrawals as well. We see that once again our hedge works perfectly. We've matched our projection termination assumption to our hedging strategy termination assumption and life is good. But, you should know what is coming now.

TABLE 8
Revised Investment Strategy

	8% Growth	0% Growth
Surrender Benefit	\$14,584	\$14,584
Bond Maturity	94,256	94,256
Option Payout	36,181	0
Liability Maturity	<u>124,797</u>	<u>88,616</u>
Profit	\$5,640	\$5,640
<ul style="list-style-type: none"> • Assume 4% annual withdrawals • Option amount = $\\$100,000 * (0.96)^4 = \\$84,935$ • Option cost = \$18,761 • Investment in bonds = \$76,239 • Bond par value = \$12,020 		

What happens if the policyholders don't terminate at the rate we expect? And what happens if we have an up market? Consider an extreme case (Table 9). We'll assume zero actual projection withdrawals. We have the 8% growth for four years, and then, based on last year, let's pretend the market actually increases by as much as 35%. We didn't buy enough call options to cover our liability risk, and we see that the profits are under water.

Let me explain this exhibit. The first item, surrender benefit, is just for informational purposes. It will help us compare the magnitude of withdrawals from one case to the next. The sum of the next two rows, the bond maturity and the option payout, represents the accumulated value of the assets that we're buying in the different scenarios. The row labeled liability maturity represents the accumulated liability value at index maturity. We see from this case that whether we have a good equity index

TABLE 9
Mismatch -- Low Withdrawals, High-equity Growth

	35% Growth - Year Five
Surrender Benefits	\$ 0
Bond Maturity	112,020
Option Payout	67,384
Liability Maturity	<u>183,666</u>
Profit	\$(4,262)

increase, or none at all, we get the same amounts of profits. This demonstrates that our hedge is working.

Note what these examples are demonstrating is that, if in your projection you use the same termination assumptions that you used for your hedging purchases, things are going to go real smoothly. It's a best-case scenario -- you're not really capturing the equity growth risk in your projections. What you need to do, I think, in running these projections, is to try termination assumptions that don't match your hedging strategy, and see where you might run into trouble.

The next source of risk is interest rate risk. We've done cash-flow testing before, so we know the risks associated with high or low interest rates. I'll use the example I had before where we had the exact hedging strategy which assumes zero terminations. The actual terminations will be 4% with zero equity growth, and we'll run the standard seven interest rate scenarios.

In Table 10, we see the result under two of the high interest rate scenarios, the pop up and the gradual increase, is that we went under water, whereas before we had a small positive result. That really shouldn't be surprising. All this shows is, since I bought a zero-coupon bond, if I have to pay out surrender benefits and liquidate part of that asset early when interest rates are high, then I'm going to have trouble. These examples are contrived simply to make that point. We'll come back in a little while to discuss how you might set these assumptions.

TABLE 10
Interest Rate Risk

	Scenario 3 Up 1% per year	Scenario 4 Pop Up 3%
Surrender Benefit	\$14,584	\$14,584
Bond Maturity	88,539	88,040
Option Payout	0	0
Liability Maturity	<u>88,616</u>	<u>88,616</u>
Profit	\$ (77)	\$ (576)
<ul style="list-style-type: none"> Assumes 0% annual equity growth 4% annual withdrawals 		

I want to talk about one more potentially significant source of risk, and that's disintermediation. The worst case, from our perspective as a company, is high interest rates, low fixed-income asset market values, and low equity returns. The question is, just because that's bad for us, does that mean that the policyholder will decide to surrender? In analyzing the interest rate risk, I'm not convinced that high interest rates by themselves will cause excess lapses. My reasoning is that the policyholder purchased the contract with the expectation that the equity market would outperform fixed income, and he or she knows that interest rates move up and down. Just because interest rates moved up does not mean they're going to surrender the contract unless they have reason to believe that the equities are underperforming.

What I think is more significant is the case where the equity returns are bad. Let's say we had a down market, equity returns were negative, and we have the European call option, which means that before we get a payoff, the equities are going to have to rebound to recover what they've lost already. In that situation, particularly if the indexed value is lower than the guaranteed fund value, it could very well be to the policyholder's advantage to surrender early; he can take the guaranteed value and buy another equity-indexed contract. That way, he gets the index appreciation right away, and he doesn't have to wait for the rebound.

1996 VALUATION ACTUARY SYMPOSIUM

How do I translate that into some kind of excess lapse formula? I've created a sample formula that compares the guaranteed surrender value to the premium multiplied by the ratio of the current index to the original index. In other words, I compare the guaranteed fund value to the indexed fund value. If the guaranteed fund value is bigger, there is a potential for excess lapse. I take the difference divided by the guaranteed fund to get the percentage by which the indexed fund is below guaranteed. Then, I use that percentage in a standard exponential excess lapse formula, the kind we're used to from making interest rate comparisons -- a multiplier times the difference raised to an exponent.

$$\begin{array}{ll} \text{Excess Lapse} & M * (D \wedge E) \\ \text{Sample Values:} & M = 2 \text{ and } E = 1 \end{array}$$

Note that the parameters that I've used here were not scientifically derived. Basically, I went through the following process. If we're 10% below the guaranteed fund, do you think 20% of the people will surrender? Fine, there's our formula. Let's look at an example just to see the impact of that formula. I took a case where equity growth is actually -20% for the first year. Otherwise, use the same assumptions as the base case -- exact hedging and no base lapses, and 8% equity growth in years two through five. When we go through the example, we see the index fund drops from the original premium of \$100,000 down to \$80,000 after one year. That's less than the guaranteed fund. Without going through the numbers, we see excess lapse rates of 27% for year one and 19% for year two. The result after five years is that we have only 56% of our original policyholders still in force.

From our previous example we know that high lapse rates cause problems when we have down market scenarios. In this case, with 8% growth for four years after the 20% loss, the option is actually going to pay off, but we still get hammered on profits because the excess lapses occur when the value for a zero-coupon bond is less than the cash surrender value (Table 11). What this shows is that there can be a disintermediation risk in situations where we have early equity underperformance.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

Having gone through the examples to try to give you an idea of what might happen, now let's look at what kind of assumptions we might see and how we might analyze the results to determine whether our reserves are really adequate or not.

TABLE 11
Disintermediation Example

	-20% Growth Year 1
Surrender Benefits	\$41,352
Bond Maturity	53,807
Option Payout	4,510
Liability Maturity	<u>61,297</u>
Profit	\$(2,980)

In terms of an equity growth assumption, the first point I'll note is that there is no regulatory guidance as there is for interest rates, where we have the seven standard scenarios. Perhaps, we could derive something analogous on the equity side. The key would be reflecting the increased volatility of the equities. I think it would be worthwhile to run some deterministic scenarios to give you an idea of where you might have problems. I would want to analyze that in my actuarial memorandum anyway, identifying explicitly where we might have problems. As far as making a judgment as to what scenarios might cause me to decide I need additional reserves, I would prefer to run a set of stochastic scenarios. I would generate stochastic stock returns that are correlated to my interest rate returns. What is an acceptable number of scenarios? I think we used to use 40. Now we typically use 100. If we pass a specified benchmark percentage of those scenarios, we'll say the reserves are adequate. If not, then we don't. What benchmark do I want to use? I'm reasonably conservative, so I might like 95%, but this is a judgment call. The issue is no different for equity-indexed annuities than for other cash-flow testing. Actuaries have argued that the benchmark doesn't need to be as high as 95%. It could be 90% or even 85%. One final point on how many scenarios -- if I run through 100, and I'm right on the borderline of my benchmark, then I'll probably run through another 100 just to verify that there wasn't any bias in my first set.

Moving on to interest rates, there are seven required by the Standard Valuation Law. I think I'd prefer to use stochastic interest scenarios and stochastic equity scenarios for this product because I'm going to need some kind of assumption as to the correlation between the equity insurance and the interest rates. If the interest rates pop up 3%, what single equity scenario is appropriate for that? Maybe I can run 100 stochastic scenarios with each of the seven interest scenarios, but then I would be running 700 scenarios, and I really don't want to do that if I don't have to.

Now, let's look at termination assumptions. How do we determine best-estimate assumptions? We don't have a lot of experience on these products yet, because they've only just been issued. The best guess, I think, would be to use your single premium deferred annuity (SPDA) or flexible premium deferred annuity (FPDA) experience, differentiating, of course, between the times when you're in a surrender charge period and when it expires. The rates are going to be influenced by product design. With the point-to-point design there are potentially severe surrender charges -- if the equity index has already increased, we don't have access to the gains yet. You're not likely to see surrenders as high with the design as with a design that lets you get most of your value out right now, which you could get on one of the ratchet designs Alan was describing. The key point, as I said before, is that you need to test variations in the projection assumptions from those you used in setting your hedging strategy. Otherwise, you're not really capturing the risk.

Finally, disintermediation again. Because the products have not been on the market very long, there is really not any experience. All we can do is make an educated guess. You can look at the derivation I did before and see if that makes any sense. Decide if you want to use a similar type of analysis. Again, the disintermediation is going to be significantly affected by the product design. In the annual increase, or ratchet approach, you only have a one-year period to consider the equity returns because there is a zero floor for every year, and each year is considered independently. For example, if you had that negative 20% in the first year, but then if in the second year the index rebounded, the annual ratchet provides the full increase right away. It wouldn't be offset by previous losses. In that situation, there's not as much disintermediation risk. There's not really as much benefit in surrendering right away and starting over again. You're going to get the increase the next year anyway.

EQUITY-INDEXED ANNUITIES -- RESERVING AND ACCOUNTING ISSUES

A couple of other modeling considerations include the projection horizon and the beginning reserves. The regulations say the projection should run until the amount of business remaining is immaterial. For this product, if you look at the index maturity date and you have minimal guarantees after that, and your asset maturities match your index maturities, you can argue that you're free to reset everything at the end of that first index maturity period, so why not just assume 100% surrenders at that point and say that's as far as I have to go? On the other hand, what if you don't have that situation? Perhaps you have an asset/liability mismatch or you have valuation of that equity option when you're doing the reserve calculations and when you're doing the asset valuations. Look at the mismatch case that I think Alan or John exhibited earlier, where we were holding liability reserves that really aren't reflecting the full market value of the index, but the asset reserves are. Consider how we've matched assets to liabilities. What that is going to mean is that you have a higher asset value than a liability value. You start plugging into the form that says beginning assets, and for beginning reserves you're not going to get to count all the assets that you really have lined up to forward the product. When that happens, you're going to find out you probably don't have enough to justify the reserves. So there will be a mismatch in liability and asset evaluation and it is really going to lead to problems just in setting up your beginning assets. I think I'll leave off here so we will have time for a couple of questions.

FROM THE FLOOR: I wanted to bring up an important point relating to the profitability of the equity-indexed product in relation to a level of interest rates. You mentioned earlier that Wall Street prices the options using Monte Carlo simulations with the Black Scholes model; therefore, the cost of the option is based upon the short-term interest rates, the interest rate volatility assumptions that they make, and the dividend pay out level of the S&P 500. Therefore, if interest rates go up, you may lose money on some of your existing business, but the option price is not going to increase as much as the interest rates go up. Therefore, you are going to have larger profits on the new business that's issued at the higher interest rates.

1996 VALUATION ACTUARY SYMPOSIUM

MR. BEESON: One thing to consider when you say you'll have larger profits on the new issues at the higher issue rates, is that the competitive pressures are probably going to influence the choice of participation rate, too. You may not be able to hold everything constant.

FROM THE FLOOR: So you think participation rates will exceed 100% then?

MR. BEESON: With some designs it is possible. One problem when participation rates exceed 100% is that the customers may not really believe what you're offering. But I think with the Asian end design, for example, we've seen participation rates equal to 100%, and it's not too much of a stretch to say that if interest rates rise, you could support a participation rate that's greater than 100%.